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GREEK PHILOSOPHY BEFORE PLATO

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GREEK PHILOSOPHY BEFORE PLATO

BY

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PREFACE

A SUGGESTION offered by Dean Frederick J. E. Woodbridge of Columbia University, to work back from Plato along epistemological lines, is ultimately responsible for this book; but the suggestion undoubtedly met with a ready response because of three years spent at Oxford in the School of Literae Humaniores under the guidance of H. H. Joachim, now Fellow of New College and Professor of Logic in the University. It is with a feeling of real pleasure that I pay my homage to these former teachers.

The original of the first six chapters of Part I was offered to, and accepted by, the Graduate Faculties of Arts and Sciences in Columbia University, as a doctoral thesis. Since then the scope and character of the work have fundamentally altered; and in this later period I owe most to Professor A. A. Bowman, formerly Chairman of the Department of Philosophy in Princeton and now Professor of Moral Philosophy in Glasgow, who read the whole manuscript and offered valuable criticisms. I wish also to express my appreciation of the spirit of helpfulness manifested by members of the staff of the Princeton University Press, and in particular to Mr. Frank D. Halsey, Assistant Manager, for his careful attention to the editing of the manuscript. Finally, I am indebted to my wife, who has read all the proofs, and to my father-in-law, President John Grier Hibben, himself a philosopher, for his affectionate interest and constant encouragement.

ROBERT SCOON

Princeton

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ABBREVIATIONS USED IN THE NOTES

<i>Archiv</i>	<i>Archiv für Geschichte der Philosophie.</i>
B, D, (under Heraclitus)	I. Bywater's arrangement of the Fragments in <i>Heraclitus Ephesius: Reliquiae</i> (followed by Burnet); and H. Diels' arrangement in <i>DFV</i> .
Burnet	J. Burnet, <i>Early Greek Philosophy</i> (Third Edition).
Cornford	F. M. Cornford, <i>From Religion to Philosophy</i> .
<i>DFV</i>	H. Diels, <i>Die Fragmente der Vorsokratiker</i> (dritte Auflage), Vol. I.
<i>Dox.</i>	H. Diels, <i>Doxographi Graeci</i> .
<i>Gk. Phil.</i>	J. Burnet, <i>Greek Philosophy. I. Thales to Plato</i> .
Gomperz	T. Gomperz, <i>Greek Thinkers</i> (authorized English edition), Vol. I.
RP	Ritter et Preller, <i>Historia Philosophiae Graecae</i> (editio octava).
Tannery	P. Tannery, <i>Pour l'histoire de la science hellène</i> .
<i>WD</i>	Hesiod, <i>Works and Days</i> .
Zeller	E. Zeller, <i>Die Philosophie der Griechen</i> (fünfte Auflage). Erster Theil.
Zimmern	A. F. Zimmern, <i>The Greek Commonwealth</i> (Third Edition).

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PART ONE
GREEK SYSTEMS OF PHILOSOPHY
TO THE TIME OF PLATO

INTRODUCTION

THAT philosophy, whatever it is or should be, was a product of the Greek genius is a commonplace of modern scholarship; and the name of the inventor, Thales, is equally famous. Hence all that might seem necessary for an historian of philosophy would be to record the doctrines of Thales and his successors. But this easy method of settling the matter includes an implication which needs to be brought into the open: it suggests that there was no philosophy before Thales, who must therefore have originated an entirely new thing. Such an implication seems to lurk in the common description of Hesiod's works as mythology, and Thales' as philosophy. But even granting the validity of this assumption, it is impossible to appreciate the newness of any thing except against the background of what went before it; for "new" means that which was not previously in existence. If therefore philosophy began with Thales, we can hardly understand the significance of its creation unless we know something about the preceding period.

But probably to most of us the case is not quite so simple. The present age, infected with an evolutionary point of view, is disposed to question the sudden genesis of novelties, and prefers to seek for their explanation in antecedent environing conditions. That change is real and new things are generated is not denied; but these changes and creations do not seem to break the continuity of history. We are thus led to the notion of prehistory.

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Primarily the term is general and refers to the period before history began; but its meaning may legitimately be extended to particular aspects or tendencies of history, and when so used, it signifies the antecedent events or influences that led up to a given effect. The implication of this concept is that new things are created but that they may be linked up with, and partially explained by, previous occurrences that somehow pointed in their direction. The essential novelty of the new is thus admitted, but it is not insisted upon to the point of obscurantism and to the exclusion of historical continuity.

We may thus speak of the prehistory of philosophy, meaning thereby the influences in Greek thought and literature before Thales, which may have had some share in the production of the thing we call philosophy. We do not yet know what those influences were, nor indeed whether there were any such at all—the answer to these questions must wait for an examination of the remains of the period; but if there were influences of this nature, we could think of them as philosophical in the adjectival sense. No doubt such a view presupposes that philosophy, or anything else we subject to the same kind of scrutiny, was a composite, some of whose elements at least existed previously; but even so we are not committed to a mechanistic or any other theory as to the manner of their final combination into a new entity.

With these prepossessions we may well ask what new thing came into being with Thales, or what was new in the thought of Thales; and in order to answer the question, we shall have to discover something in his thought which did not exist before him. With the same prepossessions in mind, we should also inquire what previous tendencies of a philosophical character, if any, may have

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suggested or occasioned the creation of philosophy by Thales; and again we shall be forced back into the preceding period.

One further consideration prompts us in the same direction. It is the knowledge that in these early times with which we are dealing there were no formal or technical divisions of subject-matter, by which men's thought about one set of objects was marked off and distinguished from thought about other sets. Sir Henry Maine notes this characteristic in the first legal codes: "They mingled up religious, civil and merely moral ordinances, without any regard to differences in their essential character; and this is consistent with all we know of early thought from other sources, the severance of law from morality, and of religion from law, belonging very distinctly to the later stages of mental progress."¹ We could add also to this list the severance of philosophy from religion and from science, which was not effected until much later. But the real truth seems to be rather that these terms themselves represent categories which did not exist in early times; and when we use them, we are applying our own classifications to objects that were then not classified. If we put Hesiod under "mythology" and Thales under "philosophy," we are not thinking in the concepts of Hesiod and Thales, for these categories had not been invented in their day. And therefore if we say that philosophy began with Thales and that before him there was only mythology, we are making a distinction which Thales did not recognize and which we must justify. This justification can be made only after a study of preceding thought and comparison of it with that of Thales.

¹ *Ancient Law*, chap. I, p. 14.

CHAPTER I

EARLY VIEWS OF THE WORLD AND THE RISE OF PHILOSOPHY

1. THE earliest records of Greek thought are to be found in Homer and Hesiod; but it is probable that the worship of local gods of nature, such as the Mother and the Maid at Eleusis, represents a stratum of culture that is as old as, and perhaps older than, Homeric civilization.¹ In these cults, as well as in the writings of the poets, we can discern traces of the prephilosophic view of the world. We shall examine these two sources of information separately.

2. If we turn to Homer and ask the question: What is it that makes things happen in the world?, the answer that we invariably find is a god. Whether rain falls, clouds arise, battle is joined and won, a prince feels angry, or a king gives judgment, the event is ultimately the result of some god's determination. It may be affirmed that in things and in men divinity is the only efficient cause of action that Homer knows.²

But the divine will is not conceived as functioning

¹ Farnell, *Cults of the Greek States*, III, p. 2; Gilbert Murray, *Four Stages of Greek Religion*, chaps. I, II; Miss Harrison, *Prolegomena to the Study of Greek Religion*, chap. I.

² Mr. Leaf, *Homer and History*, p. 19, says: "If we are seeking for historical fact from the words of a poet, the statement 'Achilles slew Hector with the aid of Athene' is precisely equivalent to the statement 'Achilles slew Hector,' neither more nor less." I might say that the historical fact which interests me now is that Homer introduced Athene.—Similarly for the early Hebrews: "Everything is supernatural, that is, direct divine operation," A. B. Davidson s.v. "God," *Dict. of the Bible*, II, p. 198.

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according to fixed methods. There is, to be sure, the three-fold partition of the world among Zeus, Poseidon, and Hades; but within their respective provinces each of these great overlords is a free agent. Zeus acts according as he wills,³ and the other gods and goddesses are moved by their individual whims or the orders of their superiors. They have their customs;⁴ and these are the only guides to action that they possess or that are known to men; but it is in their power to break their wonted habits if they choose.⁵ Moreover Fate, which sometimes is represented in later poetry as superior to the gods, is not so pictured in Homer; it and the gods appear as "concurrent and usually harmonious agencies."⁶ But their alliance brings no regularity to the operation of the world.

Divinity does not even connote moral regularity or goodness, for though at times the gods are the champions of high moral ideals, yet they are constantly described as subject to all the vices and pettinesses of mankind. Indeed, as Mr. Lang has remarked, Homer ascribes to the gods "a score of human foibles which he never illustrates in the persons of his heroic men and women."⁷ Zeller⁸ and Burnet⁹ maintain that the word for god meant primarily an object of worship, and they may be right; but the

³ *Od.* VI, 188: "Olympian Zeus himself distributes prosperity to men, good or bad, to each one according as he wills."

⁴ cf. *δίκη θεῶν*, *Od.* XIX, 43.

⁵ Helios, the sun god, threatens to go and shine among the dead, *Od.* XII, 377-383.

⁶ Jebb, *Homer*, p. 51. Sometimes an event happens "beyond fate," e.g. *Il.* XVI, 780; *Od.* I, 35. Cornford (p. 12) holds that the gods in Homer were definitely subject to fate; but he does not prove the point from his citations, and he has neglected several passages that suggest the opposite interpretation. Moreover he has confused Homeric and fifth century ideas.

⁷ *The World of Homer*, p. 121. The word *ἀρετή*, sometimes used of gods, seems to mean excellence of any sort, "praestantia," not "virtus"; see Ebeling, *Lex. Hom.*, s.v.; Leaf on *Il.* IX, 498.

⁸ *Phil. der Griech.*, p. 230.

⁹ p. 14; but he shows that this primary meaning was lost in some cases.

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question is: Why worship it? The answer, I think, must be: because the god is able to do things that will help or hinder, and therefore has to be propitiated.¹⁰ Majesty and power are the paramount qualities of the early Greek Zeus, as well as of the early Hebrew Yahweh; abominable lust was occasionally ascribed to Zeus, and the fell attributes of a tribal warrior to Yahweh, each of them being respected for his might rather than revered for his virtue.¹¹ The gods of Homer, therefore, both in their relations to one another and in the governance of their particular spheres, do not act according to stable ordinances; and as these divinities are the only effective agents or causes of activity in the world, the universe is operated without regularity.¹²

In Hesiod the gods perform much the same functions for the world. Our interest lies not so much in the *Theogony*, which describes the genealogy and history of the gods, as in the *Works and Days*, where the current views on many mundane topics find expression in the words of the poet of the common people. Here, as in Homer, Zeus appears as the all-powerful god of the world, governing all things as he wills; and though his activity is perhaps

¹⁰ cf. Jebb, *Homer*, p. 50: "The basis of Homeric religion is the feeling that 'all men have need of the gods' (*Od.* III, 48), and that the gods are quickly responsive to this need, if they are duly worshipped." cf. also *Od.* XIV, 83-4. The gods may be turned from their purpose by men, *Il.* IX, 497.

¹¹ For Yahweh as the All-powerful, cf. Huit, *La Philosophie de la Nature chez les Anciens*, p. 24; as preeminently a god of war, Addis, *Hebrew Religion*, p. 72. A. B. Davidson, s.v. "God" in *Dict. of the Bible*, argues for the moral quality of the early Yahweh, but I do not think his references are convincing. Certainly moral quality is only occasional and secondary. The prophets, beginning with Amos, first developed the ethical character of Yahweh; cf. Gore, *Belief in God*, p. 85, and for the process by which the early *numen* is moralized, Otto, *The Idea of the Holy*, chaps. VIII, X.

¹² Rohde, *Psyche*, p. 429, speaks of this view of the world as a "history of most important world-events, which was consummated in single and isolated acts of the conscious caprice of divine personalities."

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more regular and customary than in the earlier epic poems, his arbitrary power is still absolute.¹³ He is not subject to fate, but in a passage of the *Theogony* (904) is represented as having himself given the three sisters their prerogatives. The very fact that the gods can be moved by prayers and sacrifices shows that their wills are free. In short, the world and the physical events that take place in it depend on unfettered divine agencies.

In the *Theogony*, no moral character whatsoever is attributed to the gods; among themselves they act as they please and for men they are the far-away powers that rule the world.¹⁴ But in the *Works and Days*, the gods, and especially Zeus, are represented as champions of human right. Justice and the immortal guardians set by Zeus wander over the earth to watch the actions of men and to reward them accordingly.¹⁵ Prosperity comes to the home of the upright, but the wicked draw down upon themselves divine anger and vengeance. This is a conscious attempt on the part of the poet, and no doubt of the community in which he lived, to give dignity and prestige to the traditional institutions of society by representing them as god-given and therefore under the protection of the gods. The artificial character of the process is evident in such a sentence as "Gods and men are angry with him who lives idle"; and the whole scheme is an instance of the universal human tendency to create religious sanctions for social usage. In Greece this attempt was foredoomed to trouble, because it was impossible to eliminate

¹³ *W-D* 267, 268, 665-8.

¹⁴ Typical in this respect is Hecate. "Great honor comes very easily to him whose prayers the goddess receives favorably, and she bestows wealth on him, for the power is surely hers"—*Theog.* 418. But her aid does not depend on any moral quality in the worshipper—"to whom she wills it, she gives great aid and benefit" (*ibid.* 429).

¹⁵ *W-D* 249-64.

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the traditional immorality of the gods without destroying their personalities.

It will be seen from this short sketch that in the *Theogony*, where the gods are pictured *chez eux*, they appear as free agents, subject to no restraint; and that in the *Works and Days* they have theoretically the same unhindered dominion, but they serve also in a general way as sanctions for the moral order of society. They are not themselves amenable to any laws, but they hold human beings to their own human laws. Thus the physical world for Hesiod is a place of little or no regularity (though the gods have their settled preferences, which it is worth while to know), while on the other hand society has its customs or fixed rules of conduct, which the gods enforce.

3. In attempting to form an idea of the Greek view of nature, we cannot be content with the literary records but must turn as well to the local cults, in which the more popular religious beliefs are embedded. The striking feature of these cults for us is the fact that they seem to have been connected with festivals which were celebrated periodically, and among them were many that were concerned with the regular sequences of nature. The Anthesteria and the Thargelia, for example, were held in the spring and summer, and seem to have got their original significance by association with their respective seasons.¹⁶ They were annual rites that gained their meaning from the regular changes of nature. Likewise the multitudinous festivals of the Earth-goddess, Demeter, and Persephone appear to have been preeminently agrarian in their earliest forms, and in some of them we know that the rebirth and death of vegetation were symbolized. Moreover, as the

¹⁶ Frazer, *Golden Bough*, I, chap. III, pp. 320-63; Mommsen, *Feste der Stadt Athen*, pp. 384-404, 468-86.

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fertility of the earth and of human beings was closely associated in these chthonic cults, we are not surprised to find that man's existence is often thought of as subject to a cycle of changes. Indeed this notion of periodically recurring phenomena is found most clearly in the Orphic doctrine of the Wheel of Birth, where it is particularly applied to men. In its essence, this was a belief that the souls of men are reincarnated after death and live again in other bodies; and it is found in one form or another in Pythagoras, Empedocles, and Plato, as well as in specifically Orphic sources.¹⁷ Thus with regard to particular natural processes, such as the growth and death of plants and animals, the Greeks had rudimentary ideas of regular activity, and these must be put by the side of that other view of the world as a place of isolated events.

4. The implicit contradiction between these two notions was not peculiar to the Greeks, for traces of it are discernible in other peoples of the same original stock. Eduard Meyer brings out their double view of nature in the following words: "Beside the mass of particular events, which mythical interpretation referred to the volition of a god or a divinity, stands the uniformity and regular recurrence of phenonema, which precludes every caprice and subjects it to a law."¹⁸ In Greek thought nowhere are the elements of this latent contradiction more closely interwoven than in Hesiod's *Works and Days*. I have already emphasized his belief in divinity as the cause of physical occurrences; but we must also notice that in the latter part of the poem the year is spoken of as revolving and the work proper for each season is pre-

¹⁷ Lobeck, *Aglaophamus*, II, chaps. III, IV; Miss Harrison, *Proleg.*, pp. 589-600; and the Compagno Tablets discussed by Gilbert Murray, pp. 668 ff.

¹⁸ *Geschichte des Altertums* I, 1, §69.

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scribed. The author professes to believe that the gods specially assigned certain labors to particular days, and as men were dependent on the assistance of the gods, men should know these daily proprieties. But whatever the true reason for this distribution of times, the result of the rules given was to make a fixed calendar of the year or the month, and thus to introduce order and regularity into the life of the laborer.¹⁹ Hesiod therefore combines the two points of view with regard to nature; he gives evidence of a belief that each event is the particular effect of a god's will, but he also perceived the regularly recurring seasons and the ordered work that this fact brings to the farmer. It was probably just because he held that the seasons were divided by the will of the gods, that it was impossible for him to extend his idea of regularity into the whole of nature. The world was still in the grip of the gods, though they had "settled down" to a fairly definite course of customs.

This was as far as the Greeks got in their ideas of nature until Thales grasped the idea of natural regularity. Although in specific fields the gods of nature were thought of as undergoing stated, periodic transformations, yet the anthropomorphic personalities of these gods, both in literature and in religious celebrations, were so inextricably suffused with whimsical freedom of action that no general conception of uniformity in nature could arise.

5. Now that we have surveyed the ancient view of the physical world as seen in Homer, Hesiod, and the chthonic cults, let us turn to the organization of human society and man's conception of its stability. Homeric society was formed on the monarchic principle, and the king, beside being the political and military head of the state, was

¹⁹ Waltz, *Hésiode et son poème moral*, p. 74.

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vested also with the prerogatives of high priest and judge.²⁰ The sacrifices and prayers which he made for the city were ordinary matters of ancient life, in which no dislocation of individual status occurred, and it would perhaps not be too great an exaggeration to put war in the same type of administration; certainly fighting was regarded as an inevitable, although intermittent occupation for all men, and the state was so organized that it could conduct a war without recourse to extraordinary changes in its structure.²¹ On the other hand, every crime, every revenge, every legal contest involved the position of one or more elements in the whole social organism; and it is at this point that we can remark most clearly any attempt to secure the continuity and regularity of human activity.

The Homeric idea of an ordinance or rule of action is embodied in the word *Themistes*, which were dooms or judgments passed in each particular case by the king or the judge, without necessary reference to any traditional or fixed standard. These decisions were supposed to be the result of divine inspiration,²² and owing to their origin from on high, they do not appear as connected by any general principle of right. They were, as Sir Henry Maine said, "separate, isolated judgments."²³ Homer knows no legislative or constitutional enactments having universal

²⁰ cf. *Il.* IX, 99. But the king was not the only judge; cf. L. Brehier *De graecorum judiciorum origine*; the trial scene on the shield of Achilles, *Il.* XVIII, 497-508, Leaf notes *ad loc.* and in *Journal of Hellenic Studies* VIII, 122; Zimmern, p. 508.

²¹ The Romans of Republican times seem to have recognized that war might produce an abnormal condition in the state, and they made provision for it by the temporary appointment of dictators. As a constitutional practice, this was all but unknown in Greece. On the *aesymnetes* see Arist. *Pol.* III, 14, 8.

²² cf. *Il.* I, 238.

²³ *Ancient Law*, chap. I, p. 4.

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validity in a state.²⁴ Every action that gave rise to dispute was settled as an individual case; and from this point of view there was no more regularity in the events of organized society than was observed in nature.²⁵

This, however, was not the only point of view from which the Homeric man acted. It is plain that custom exercised a restraining force and doubtless had already begun to influence the king's decisions, so that they would not be entirely arbitrary.²⁶ Moreover the very fact that society was organized with an official having general jurisdiction was an instance of orderly political working and was regarded as a mark which distinguished the Greeks as a superior race. The Cyclopes, for example, "have no deliberative assemblies or themistes . . . but each one exercises jurisdiction over his children and wives, and they have no regard for one another."²⁷ As Maine suggests, the Cyclopes are Homer's type of a barbarian and inferior nation.²⁸ Thus the warriors of the *Iliad*, who do have their themistes, are in a transition from a state of social disorder and irregularity to an era of customary law.²⁹

With the accumulation of a body of decisions, which would very soon acquire the force of precedents, broad

²⁴ The word νόμος, law, does not occur in Homer. θέμις (singular) and δίκη were only beginning to acquire the significance of customary usage and so "what is right." cf. Maine, *loc. cit.*; Jebb, *Homer*, pp. 48, 49. Hirzel, *Themis, Dike und Verwandtes*, is instructive, but the author has not been careful to distinguish meanings of different periods.

²⁵ In this connection it is worth quoting a phrase of Maine's; he speaks of "ancient society, in which every man, living during the greater part of his life under the patriarchal despotism, was practically controlled in all his actions by a regimen not of law but of caprice."—*Ancient Law*, p. 7.

²⁶ cf. Maine, *Early Law and Custom*, p. 163.

²⁷ *Od.* IX, 112-15.

²⁸ *Ancient Law*, chap. v, p. 133. cf. also Keller, *Homeric Society*, p. 3; Arist. *Eth. Nic.* X, 9, 1180 a 28.

²⁹ The transition is described in Grote, Part II, chap IX, the main points of which have not been modified by recent investigations. cf. also G. Gilbert, "Beiträge zur Entwicklungsgeschichte und d. griech. Rechtes," in *Jahrb. für klass. Phil.*, 1896; Zimmern, Part II, chap. III.

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principles of conduct would emerge from the mass of separate judgments. Already in Hesiod, the existence of this customary law is plainly discernible, although the old idea of judgments emanating from Zeus has not entirely died out.³⁰ But *δίκη* has taken on the connotation of justice in general as a possible characteristic of all men who are willing to observe the sanctioned rules of society, and with this conception has come the notion of recognized modes of action. Now Hesiod expressly says that Zeus gave *δίκη* to men only and that not even animals shared this quality.³¹ Thus the human race was distinguished from the rest of the world by the possession of stable laws of conduct.

The process of standardizing conduct went on and culminated in the great legal codes that appeared not only in the states of continental Hellas, but also in the colonies of the West and on the Greek seacoast of Asia Minor. Naturally these bodies of law did not come into existence in different cities at the same time; but in general they are to be referred to the seventh, and the early part of the sixth, centuries.³²

6. If we compare men's ideas of nature with the legalistic constitution of society at successive stages of development, we shall find a remarkable analogy between them. Both from Homer and from the evidence of anthropology, there are discernible traces of a period in which the events of the physical world were regarded as the isolated and

³⁰ *W-D* 36; *Theog.* 81-96.

³¹ *W-D* 278-85.

³² e.g. Zaleucus at Locri, Pittacus at Mytilene, Draco and Solon at Athens. cf. Wise in *Companion to Greek Studies*, 391 ff.; E. Meyer, *Gesch. d. Alt.* II, 360. There are some very instructive sentences in the *Recueil des inscriptions juridiques grecques* (2nd series, 1st fascicule) on Solon and early criminal law. It is impossible to date the so-called laws of Lycurgus at Sparta, and it is doubtful if they may be properly classed as laws or a code; cf. E. Meyer, *Forschungen*, I, pp. 211-83.

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particular effects of a divine whim or will; and the societies in which these conceptions are found were held together by the isolated and particular ordinances of a supreme chieftain. This condition is superseded by another, represented in different degrees by Homer and the Hesiodic poems, in which certain regularities of nature, such as death and the seasons of the year, which had long been emphasized in many local cults, have been generally appreciated and are considered as the custom of the divine agents; and at the same period, the social organism is bound by the usage and custom which have been accumulating. After this, we shall not be surprised to find that the era in which political societies regulated their existence more or less extensively by uniform rules of legal procedure was also that which witnessed the discovery that the outside world was likewise regulated by principles of uniform activity.

Codes of law were apparently first introduced into the Greek colonies of the West, where the lack of historical background for political development, as well as the freer and easier conditions of life would naturally lead men to crystallize their ideas of government, in much the same way as the American colonists wrought out their constitution. That this tendency to codify—and no doubt partially to reform—social usage was felt in Ionia seems to be proved by the reported discovery of a mutilated stone pillar from Chios, which has preserved the evidence of an early written constitution and even of a popular law court.³³ We may thus infer that the original home of

³³ Wilamowitz-Moellendorf, *Staat und Gesellschaft*, p. 78. Zimmern, p. 131, thinks that "the constitutional movement probably originated, like Greek poetry and philosophy, in Ionia."

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philosophy had experienced to some degree the demand for political regularity.

From the point of view of uniform activity, both the organized state of society and the outside physical world were conceived in similar terms. In the body politic, disorder and dislocation of the individual's condition were considered inevitable, and in the earliest systems of law no serious attempt was made to prevent this original irregularity. The ultimate purpose of the first codes was apparently to facilitate a readjustment *after* the normal order had been disturbed. As a general rule, they did not contain definitions of positive rights which could not be violated; but they outlined and clarified the procedure by which the necessary rearrangement should be made, after ordinary conditions had been upset.³⁴ The whole process therefore implied an initial state of disorder, a readjustment, and a uniform method of procedure.

— In the physical world the same conceptions are employed by the first philosophers. Aside from Thales, of whose ideas very little is known, Milesian cosmology took as its datum the apparent conflicts between natural elements, such as heat and cold, or winter and summer. Both Anaximander and Anaximenes commenced their solutions of the problem by reducing all strife, and in fact all movement, to the interaction of two opposing bodies or tendencies. And Heraclitus was true to the Ionian tradition in starting his system with the thesis that the world is in a continual state of war. Greek philosophy,

³⁴ Maine, *Early History of Institutions*, chaps. ix, x, notices the predominance of rules of procedure (cf. "adjective law," Holland, *Jurisprudence*, 9th ed., p. 337, n. 2) over rules of substance or definitions of rights in the Twelve Tables, and generally in primitive codes. With this view Pollock apparently agrees, Intro. to *Ancient Law*, xvii.

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like Greek law, had its point of departure in a desire to escape from conditions of disorder.

The first philosophers had observed that in this ostensible confusion there were traces of regular activity, which they undertook to explain. But instead of developing the idea of a determined sequence of events or mechanical causation, they kept the apparent strife and introduced regularity in the form of an *ex post facto* readjustment. Anaximander's opposites are represented as bound to do justice to each other for all unjust encroachments, and Heraclitus had the same idea in mind when he said that if the sun (fire) oversteps his measures, "the Erinyes, the assistants of Justice, will find him out." Regularity therefore was a retroactive justice, a compensation for previous irregularity by subsequent irregularity in the opposite direction; and physical law, like the principles that governed society, was a procedure according to which irregularity was made regular. In both cases the compensation was not primarily the restoration of an equilibrium, but an opposite irregularity.

It would be absurd to suppose that the existence of regularity in the actions of society caused the discovery of regularity in the natural world. But when Thales and his successors observed the uniform occurrence of certain physical processes, they explained them by extending to them the concepts already in use for analogous processes of society. Men's ideas of the external world have commonly been conditioned by their knowledge of themselves; and it was surely a memorable advance to think of the world in terms of known human activity instead of the imagined behavior of mythical divinities. Moreover in the infancy of speculation, human beings were regarded as kith and kin to the rest of the world, and it was taken

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for granted that what was true of one part was also true for the others. All through presocratic inquiry, with the possible exception of the Pythagorean philosophy, there ran the assumption that the principle, no matter what it was conceived to be, worked in human beings just as it did in all the materials of the world. It involved no metaphor, no figure of speech, to apply the attributes of mankind to the objects of the physical world.

7. The idea of the world as lawful and regular appears therefore as the motif of the earliest philosophy, and we would naturally expect its authors to be interested in those regions of nature where these characteristics were most obviously manifested. This is exactly what we do find, if we may put even a little trust in the doxographical tradition which grew up around the first philosophers; for according to this tradition, the main object of investigation in the Milesian School was the phenomena of the heavens, where the periodic recurrence of events is most striking and to which superficial terrestrial changes may frequently be traced. Problems that would now form the subject-matter of astronomy and meteorology seem to have been predominant in the speculation of the first philosophers; and their solutions of these problems, always by means of cyclical motions, are sufficient evidence that they had appreciated natural regularity.

The most conclusive single indication of this attitude is the well known story that Thales predicted the eclipse of the sun, which has been calculated for the year 585 B.C. The historical evidence for this prediction is good,³⁵ and

³⁵ It comes from Herodotus (I, 74), and from Diogenes Laertius (I, 23), who quotes Eudemus, Xenophanes, and Herodotus. Xenophanes may well have had first-hand information.

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there is no inherent improbability in the story.³⁶ If we accept it, we must suppose that Thales had learnt the Babylonian astronomical tables, and that means that the first Greek philosopher was concerned with the recurrence of celestial phenomena. Tradition also connects the names of Thales' successors with other astronomical achievements, but the evidence here is insufficient to do more than strengthen the probability that the Milesian inquirers were versed in the science of the heavens, from which they appear to have discovered the general suggestion of natural regularity.

Such information as these investigators had was a new thing, or at least it was used in a way that made it a new thing. It was a different kind of knowledge from any that had heretofore been in the possession of their countrymen; it rested on empirical facts which gave it a credibility such as the traditional saga never had. It was more like the practical knowledge of a ship-builder or a goldsmith, who knew quite exactly the effect of a hammer-stroke; only it did not involve the variability of materials which was always present in the handicrafts. It was therefore a

³⁶ We know that the Babylonians predicted eclipses on the basis of cycles discovered from observations covering hundreds of years: Milhaud, *Nouvelles Etudes*, p. 91, Burnet, *Gk. Phil.*, p. 7. We know also that Mesopotamian influence was felt in Lydia at least as early as Gyges, who died about 650 B.C.: Cylinder Inscription E of Ashurbanipal, in Hall, *The Ancient History of the Near East*, pp. 504, 505. With Lydia Miletus was in close relations: Hall, *The Oldest Civilization of Greece*, pp. 275-7, Maspero, *Histoire Ancienne, Les Empires*, p. 426. So that Thales might have learnt his astronomical data from the Babylonians by way of Lydia. There is also other evidence of the transmission of Assyrian and Babylonian culture to Ionia; Hall, *The Ancient History of the Near East*, p. 533: Hogarth, *Ionia and the East*; King, "Sennacherib and the Ionians" in *Journal of Hellenic Studies*, XXX. But the statement of Miss Clerke, s.v. "Astronomy: History" in *Encyc. Brit.*, 11th ed., that "A Babylonian sage named Berossus founded a school about 640 B.C. in the island of Cos, and perhaps counted Thales of Miletus (c. 639-548) among his pupils" appears to involve false chronology; Berossus is said to have been contemporary with Antiochus II (250 B.C.).

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definite and empirical knowledge of uniform processes, which might well be dignified by the name of science. And the possessors of this scientific information in regard to the heavens would naturally be interested in other subjects in which similar knowledge might be gained. So we find that Greek tradition ascribes considerable versatility in geometry to some of the early philosophers, and the Pythagoreans developed arithmetic and harmonics.³⁷ With the exception of Xenophanes, who had a religious rather than a scientific turn of mind, all the great figures of the presocratic period outside of the Eleatic School may be connected with some scientific interests, although in the case of Heraclitus that interest was slight; and it was part of the service rendered by the Eleatics that they did not develop theories from sense experience, but argued the validity of their propositions without any appeal to observed data. We should then think of the Milesians and Pythagoras, the originators of Greek philosophy, not as mere speculators about the stars, the clouds, and the world in general, but rather as men in the possession of certain new and marvellous principles of natural activity, which meant a revolution in current views of the world, and which they had to interpret to the best of their abilities in order to put something in place of the old discarded mythology.

To men who knew the movements of the stars and saw the operation of uniform activity in nature, the old tales of personal gods and goddesses, who managed the world to their liking and to whom men in their ignorance paid homage, must have seemed such ridiculous fiction as hardly to deserve attention, and yet so subversive of a proper conception of human life as to be degrading. The

³⁷ See below, Part II, chap. II.

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young science could not fail sooner or later to conflict with the traditional views, and that opposition began at least as early as Xenophanes. He denied the old anthropomorphic gods altogether and condemned the effete culture which had grown up on the background of "those fictions of the men of old" amid the luxury of Lydian culture. Heraclitus too preached against the defilements of current religious practices. Indeed, with the exception of the Milesians, of whom we cannot speak for lack of evidence, there was no early Greek philosopher of importance who did not attempt to give a new and better meaning to life through his scientific investigations and philosophy.

8. It will thus be best to think of Greek philosophy as starting with the appreciation that the regular sequences of nature, such as the phases of the heavenly bodies or the seasonal changes in the elements, were evidences that physical events were not caused by some divine caprice but proceeded with a regularity similar to that which characterized the actions of men in political societies. Yet as not all human actions could be regulated by law,³⁸ so in nature many things seemed to happen without order; and it was not until later, when the concept of natural regularity had been extended, that the idea of a cosmos or ordered universe arose. And even then so many events remained inexplicable that a goddess or force called Chance had to be assumed as their cause.³⁹ But the discovery of

³⁸ Customary law could not regulate all actions, and the codes did not embrace all of customary law. Even the Twelve Tables "did not purport to include the whole of recognized customary law."—Sir F. Pollock, note A to chap. I of Maine's *Ancient Law*.

³⁹ cf. Allègre, *La Déesse Grecque Tyché*, I, chap. vi. Probably cosmos did not connote a completely ordered universe, except possibly to the Pythagoreans. On this point Professor Bowman has written me as follows: "The genesis of the cosmos-idea appears to me to be the substitution of a single world for a plurality of worlds, the single world not necessarily

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regularity in nature was significant in spite of its incompleteness; for it not only gave the impulse to Greek science, it also brought a new conception of human life. On the physical side, man, as a part of the world, was now seen to be subject to the regularities of his world, and the conditions of his existence were determined by the operation of inexorable materials, rather than by the favor or displeasure of susceptible divinities. On the human side, man was rid of the interference of the gods in his own inner life, and was therefore free to develop his ideas of individual worth and of social sanctions for conduct.

a completely ordered one. The points in my argument are: (1) while it is true that the cosmos-conception is later, the plural conception of *κόσμοι* is as early as Anaximander; (2) with the denial of the *ἄπειρον*, e.g. by Aristotle, the *κόσμοι* tumble together into a *κόσμος*, i.e. one world takes the place of a number. But this does not imply that the one world is completely ordered; it includes *τύχη* and *τὸ συμβεβηκός*. In a word the idea of unity seems to me more fundamental than that of the degree of order in the cosmos. The transition is that from a point of view from which *κόσμος* is not synonymous with *τὸ ὅλον*, *τὸ πᾶν*, to a point of view from which it is."

CHAPTER II

THALES, ANAXIMANDER, ANAXIMENES

1. THE philosophical attitude, which was contrasted in the previous chapter with the traditional views of the world, had its origin in Miletus, a Greek city on the western coast of Asia Minor, in the district called Ionia. This district consisted of seaboard and adjacent islands, and its position naturally favored commercial enterprise both on land and by sea. By commerce the Ionians were brought into touch with many other peoples of the Mediterranean area as well as with the great power of Babylon, and these associations must have stimulated their native temperament. At any rate to the Ionians are due the earliest literary development of the Greeks, many advances in the arts and in trade, as well as the beginnings of science and philosophy.

2. The individuals whose names are connected with the origin of philosophy were Thales, Anaximander, and Anaximenes, three natives of Miletus. The date of Thales can be roughly determined by the eclipse which he predicted and which has been calculated for the year 585 B.C. Apparently he wrote nothing and all our information concerning him comes from tradition, which has been preserved by Herodotus, Aristotle, and later historians. We have already seen that Thales probably knew the Babylonian astronomical tables, and he was also credited with the introduction of certain Egyptian rules of mensura-

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tion, by which he measured the distance of ships at sea and the height of pyramids. Furthermore he was active in the political life of his city, and became known as one of the Seven Wise Men of Greece.

For his philosophical and scientific views we have to depend in the last resort on the meager tradition preserved by Aristotle, from which only two points of importance stand out: (1) water is the material cause of all things, and the earth floats on water;¹ (2) all things are full of gods, and the magnet is alive, for it has the power of moving iron.² We must remember that these views are expressed in the words of Aristotle, and the notion of a "material cause" in particular must have been foreign to the mind of Thales. How he believed water could explain the world is a matter of conjecture, but it is probable that he had in mind such processes as the silting of rivers and harbors, subterranean springs, dew, mist, rain, and evaporation, in which water seems to appear from other things and to be transformed into other things. The remark about gods we shall notice later.

3. Anaximander was probably born about 610 B.C, but no doubt the later tradition is right in making his philosophy follow that of Thales. He is represented as having been the first to construct a map, and he conducted a colony, probably to the shores of the Pontus. He wrote a work in which he set down his views of the world; and although only one fragment now remains, the whole must have been in the hands of Theophrastus, Aristotle's successor, who collated the opinions of the early philosophers. Our information regarding Anaximander is therefore more definite and detailed than in regard to Thales.

¹ *Met.* I, 3. 983 b 21; *De Coelo* II, 13. 294 a 28.

² *De An.* I, 5. 405 a 19, 411 a 7.

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In his attempt to explain the world, Anaximander apparently started with processes like the alternation of day and night, or winter and summer, in which there seem to be two things of opposite qualities; and he probably thought that the most general case of this sort is to be found in the hot and the cold. From two things of opposite qualities, that alternate, it was an easy step to the opposition between the two things; and Anaximander believed that opposites "opposed" one another, so that the alternation was the encroachment of one on the other. Any such encroachment was of course "unjust" to one opposite, and if continued, would result in entirely annihilating it. The alternation meant that nature did not allow this to take place, and that there was a Justice or (as we should say) a law of regularity in the world, which compensated for each encroachment by a subsequent encroachment in the opposite direction. Every advance of one opposite would necessitate an additional supply of it, and Anaximander accordingly posited a boundless stock from which the opposites were replenished; as this stock must contain all the opposites, it could not be identical with any one of them and no name except Boundless could be applied to it.³ The process by which opposites appeared out of the Boundless Anaximander called "separating off," by which he no doubt meant that the Boundless detached a part of itself and this part in turn differentiated itself into the hot and the cold, so that separation from the Boundless involved both a quantitative and a qualitative definition. He thought of the hot as a ring of flame surrounding a cold center composed of earth and air, the flame of course constituting the substance of the heavenly bodies; and probably he believed that the hot

³ Simplic. *Phys.* 24, 13 *DFV*, p. 13.

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and the cold set up a motion analogous to an eddy or vortex, in which heavy things tend toward the center and light things toward the periphery.⁴

4. The third Milesian philosopher was Anaximenes. Of his date we can only say that tradition made him follow Anaximander. He wrote a book which was probably known to the later historians of philosophy, although only one or two fragments of it are extant. Thales and Anaximander were distinguished as inventors, public men, and original investigators; Anaximenes on the other hand appears only as a consistent theorist, and he illustrates the fact that science advances by theoretical interpretation as well as by discovering new facts.

Anaximenes held that the diverse elements of nature, such as fire, clouds, water, earth, and stones, represented merely different degrees of density of one and the same substance; and he identified this universal substance with air. "When this is dilated into a rarer form, it becomes fire, while on the other hand air that is condensed forms winds; moreover from air cloud is produced by felting, and if this process goes further, it gives water, still further earth, and the greatest condensation of all is found in stones."⁵ This theory, in its simplicity of conception, marks an advance over the thought of Anaximander; and in reducing all differences between elements to differences of density, it put science on the way to purely quantitative determinations. In his conception of air Anaximenes included mist, vapor, wind, and breath; and the fragment of his work which reads: "Just as our soul, which is air, sustains us, so breath and air encompass the whole

⁴ Ps.-Plut. *Strom.* 2 DFV, p. 13. cf. Heidel in *Proceedings of the American Academy* XLVIII, 686, and *Classical Philology* 1, 279. For other scientific theories of Anaximander see below, pp. 252-5.

⁵ Hipp. *Ref.* I, 7 DFV, p. 18.

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world,"⁶ shows that he thought of air as the life-giving breath of the world.

5. We have reviewed the bare outlines of the Milesian systems, so far as they are of philosophical interest; and what we have now to do is to attempt an appreciation of their novelty. One point of contrast with preceding thought stands out immediately: whereas the traditional views had connected an event with a god, the Milesians connected events with one another. For example, Anaximander related the appearance of the hot (e.g. in summer) with the appearance of cold (e.g. in winter); and Anaximenes related the breathing of human beings to the activity of cosmic air. Such relations must have involved a rudimentary appreciation of what we mean by natural regularity.

But apparently this appreciation did not necessitate the creation of a new set of scientific or "natural" categories. No new categories are discoverable in our sources of information about the Milesians, and these same sources indicate that the first philosophers continued to employ the most important of the traditional categories, namely, divinity. Aristotle and several of the doxographers report that the first philosophers either said their principles were gods or ascribed to them such attributes of divinity as eternal existence and indestructibility.⁷ We must then endeavor to understand this point.

The idea of nature, even in the vague form in which it was implied in the Milesian systems, would immediately entail the discarding of the old gods who acted as they chose and obeyed no laws—the gods, I mean, of literature;

⁶ Aetius I, 3, 4 *DFV*, p. 21.

⁷ Arist. *Phys.* III, 4, 203 b 14; for the testimony of Aetius and Cicero see Diels *Dox.* p. 301, 21 and p. 531, 4-6, 17, 18. Also Simplic. *Phys.* 465, 13 d RP 17 b.

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but it would not necessarily hold the same fate for the popular gods of nature, who already were conceived as more or less settled in their habits. These divinities were closely associated with elements or processes of nature—Ge or Gaia was both the earth and the earth-spirit; likewise Poseidon was the sea and the sea-god; and the characteristics of the natural elements were the attributes of the god of that element. The philosophers apparently thought of these elements in much the same way as popular religion did, that is, as possessed of divine powers.⁸

The idea of divinity no doubt included various connotations, but we have previously seen that in Greece at the time now under discussion the fundamental element in this idea was that of power. The power of a god, however, was different from the power of a man or beast in that it was not derived and restricted, but original and free. A god was a being that could originate action; and by using the epithet of divinity, the cosmologists must have meant that their material principles had in themselves the power of spontaneous movement. What Thales and his successors were investigating was the regular changes in the world; and when they found a substance, such as water or air, which seemed to take different forms without the aid of anything else and whose presence caused other things to undergo transformations, they called it divine in order to bring out the fact that it had this very power of spontaneous change. Aristotle criticized these early thinkers

⁸ Burnet, *Gk. Phil.* p. 29, says: "No one who has once realised the utterly secular character of Ionian civilisation will ever be tempted to look for the origins of Greek philosophy in primitive cosmogonies." I agree—indeed my thesis is that philosophy arose from an appreciation of natural regularity. But Mr. Burnet's notion of Ionian civilization seems extreme; Xenophanes and Heraclitus indicate plainly that the Ionians had a religion and were not "utterly secular." I am now maintaining only that Ionian science arose without the invention of a new set of categories.

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for taking no account of a cause of change—"the material substrate," he says, "is surely not the agent which effects its own transformation" (*Met.* I, 3. 984 a 21). But he had arrived at a distinction between the matter out of which things are made, and the agent by which things are made; and that distinction was wholly foreign to the Milesian point of view. The traditional notion of the world had been that every part of it had its own god who produced its transformations, and when the personality of these gods was given up, the elements were conceived as transforming themselves. If the term animism is used to describe the doctrine that things have spirits or gods in them, then the traditional Greek attitude may be called animistic; but by the same token the philosophic attitude may not be so described because it made no distinction between the spirit or god and the thing. The term hylozoism has sometimes been employed to differentiate this philosophic attitude from the earlier one, and there is no harm in this usage provided it does not connote a separation of the power from the thing. In other words, for the early Greek philosophers, the natural elements were as active as they had been with personal gods in them, but the separate personality of the gods was discarded.

The difficulty, however, in the reports about the Milesian thinkers lies in the fact that they had more gods than one. How could water be the cause of change in other things, if these things changed themselves? And if Anaximander's Boundless was divine (it was described as eternal and ageless), what was the sense of saying that the innumerable worlds which arose out of it were gods? The explanation of this doctrine also is to be found in the prevalent idea of divinities. It was a commonplace of Greek religion to have a supreme god and inferior

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gods, who owed their position and prerogatives to their superior. It would therefore be perfectly natural for Thales and his successors to have a similar hierarchy—a primary cause or substance and begotten causes. The *Stromateis*, in describing Anaximander's cosmology, says: "Something *capable of begetting* hot and cold was separated off from the eternal at the creation of this world, and *from this there grew up* a sphere of flame. . . ." (*Strom.* 2 DFV, p. 13.) The operation of the first principle was a production out of itself, and each derivative had some spontaneous activity from its parent stuff.

This interpretation of the Milesian cosmology throws some light on a question that has been much discussed: whether the principles were conceived of as the original material out of which things were created in a past process, or as the present permeating cause of growth and change.⁹ There is evidence for both of these interpretations, and that would seem to mean that the principles were thought of in both ways. There will be nothing strange in the union of these two functions, if we think of the principles as divinities, each of which passed on to his descendants some of his spontaneous power with his substance. I believe that the ideas of material substrate, permanent-latent force, and first cause were not distinguished in the first Greek philosophy, but rather formed aspects of the various cosmological principles. According to this view of the world, the material out of which differ-

⁹ Woodbridge, "The Dominant Conception of the Earliest Gk. Phil." in *Philosophical Rev.* X; Heidel, "Qualitative Change in Presocratic Philosophy" in *Archiv f. Gesch. d. Phil.* XIX; Lovejoy, "The Meaning of *φύσις* in the Greek Physiologists" in *Philosophical Review* XVIII, 4. Much work has been done on the meaning of *φύσις*, especially by Burnet, p. 10, Heidel in *Proc. Am. Acad. Arts and Sciences* XLV, No. 4, Beardslee, *The Use of ΦΥΣΙΣ in Fifth-Century Greek Literature*; but there is no good evidence that the Milesians used the word.

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ent elements have been formed still lives in them, and by virtue of its divine, active force, these particular elements are now transformed and changed.

Perhaps, in this connection, not enough has been made of the fact that the principle is often described as final as well as original. In a passage of Simplicius, which may give Anaximander's own words, we read: "And into that from which things take their rise, they pass away once more, as is ordained" (*Phys.* 24 *DFV*, p. 13). Xenophanes held that "all things come from earth and in earth all things end" (frag. 27), though earth itself is probably but a passing transformation of the principle. Heraclitus, a later Ionian, may quite possibly have believed that Fire, his principle, would one day "come upon and lay hold of all things," although Burnet has argued against such an interpretation of the passage.¹⁰ So too Diogenes of Apollonia, who carried on the Milesian tradition, held that all differentiations return to the unity from which they have arisen (frag. 2, *DFV*, p. 334, 18-20). In general, Aristotle thought of the early principles in this way, as is evinced by the following passage from the *Metaphysics*, which I render literally: "Most of the first philosophers thought the principles of all things were in the form of matter alone; for that out of which all things are and from which, as the first, they come into being, and into which, as the last, they pass away . . . this they say is the element and this the principle of things" (*Met.* I, 3. 983 b 7). If Aristotle is right in this view, as I believe he is, the Milesians held that the present world is a stage between the original simple state of the principle and the later condition in which the principle will receive its

¹⁰ Heraclitus, frag. B 26-D 66; Burnet, p. 158. Zeller, Diels, and Gomperz have held that Heraclitus believed in a general conflagration.

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transformations back into itself.¹¹ The principle thus is the substance which created things out of itself and by its presence in them keeps them in a state of change until they pass away into it again.

Upon such an interpretation of the Milesian cosmologists, we are entitled to say that they were interested in the reality of the world from a scientific point of view. They believed that the strife observable in nature did not tell the whole story. The appreciation of regular activity in nature at once removed the possibility of unrestrained deities governing the world according to their personal whims, and the first philosophers therefore asked themselves what part of the world could produce these regular sequences. They took it for granted that, if there was such a cause of change in the world, it would explain not only the apparent transformations, but also the origin of the different natural elements. In other words, they supposed that causation was explicable only by reference to creation. Their problem was accordingly the quest for a substance, which, through a process of productions out of itself, was still active in its various derivatives. And in the case of Anaximander's Boundless, at least, the search for such a substance led to the first postulation of a "scientific object," that is, an object not directly perceived, but inferred as the permanent active condition of perceived objects.¹²

¹¹ Aristotle himself, perhaps metaphysically a little "off his guard," says in *Eth. Nic.* X, 3, 5: "It seems that it is not possible for anything to come out of just anything, but what a thing comes out of, into that it is resolved." He is speaking of pleasure and pain.

¹² cf. Whitehead, *The Principles of Natural Knowledge*, p. 93.

CHAPTER III

PYTHAGORAS AND XENOPHANES

1. AFTER the first three philosophers of Miletus there came three other thinkers who were not natives of that city, and whose thought was so charged with individuality that they are usually treated separately in the history of philosophy. They were Pythagoras, Xenophanes, and Heraclitus. And while they were unquestionably individualities, there are, I believe, two reasons for thinking of them together.

In the first place, they appear to have taken the Milesian doctrines as the bases for their own particular systems. Samos (the early home of Pythagoras), Colophon (the native city of Xenophanes), and Ephesus (where Heraclitus was born and lived) were, like Miletus, centers of Ionian culture; and there is every reason to suppose that the philosophical views and discoveries of the Milesian investigators should have become quickly current in the district, which was intellectually homogeneous. Furthermore we shall see that each of these later philosophers constructed his system around the central notion of regular, cosmological opposites, which had played so large a rôle in the thought of the last two Milesians. This is especially and obviously true of Pythagoras and Heraclitus; and the "earth and water" of Xenophanes were no doubt an illustration of the same idea. Hence the doc-

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trines of these three men were Ionian in their provenience and Ionian in a fundamental point of view.

The second reason for considering them together is found in their attitude toward religion. The Milesian cosmology, at least as we now know it, had not been developed into anything that might legitimately be called religion, although it undoubtedly contained an implication that could easily be so developed. It was characteristic of the thinkers to whom we are now turning that they definitely included religion among their doctrines. During their lifetime Greece was experiencing a revival of very primitive religious beliefs in the form of mystery-cults, which probably came from Thrace. From our own standpoint, it appears as if the new Ionian science made the old gods impossible, only to be confronted with the more primitive practices of the Orphic mysteries. At any rate, in the time of Pythagoras, Xenophanes, and Heraclitus, religion must have been a matter of great concern; and certainly each of them, in elaborating his own philosophy, was profoundly affected by religious considerations.

Xenophanes and Heraclitus are outspoken in their opposition to the traditional theology, and the whole tenor of Pythagoreanism implies a similar attitude. Thus these three philosophers were alike in starting with Ionian science and opposing the teaching of the poets; but they reacted in quite different ways to the mysteries. Pythagoras accepted many of the principles of the mystic cults, and attempted to incorporate them in his own philosophical system. Xenophanes is reported to have ridiculed the mystical doctrines of Epimenides and of Pythagoras; and that is in keeping with his rôle of satirist and with the general character of his thought. Heraclitus roundly condemns the mysteries, as well as the authors of the tra-

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ditional views about the gods; but Heraclitus had a weakness for condemning people, and as a matter of fact his view of the soul was so new and so similar to the mystical view in some respects, that he may well have been influenced by the latter. Thus these three thinkers differed widely in their religious views, as shown by their attitudes toward the mysteries; but they were similar in the more fundamental quality of a definite religious side to their philosophy.

2. The extraordinary appeal of the mystic doctrine lay in its reputed purification of the soul, and it was apparently this notion that Pythagoras took as the central feature of his teachings. The means of purification in the cults was a ritual or celebration in which the soul seemed to lose contact with the body under the influence of some strong external stimulus. The difference between the popular forms of mysticism and the doctrine of Pythagoras arises at this point; for the philosopher appears to have substituted the contemplation of the heavens (*theoria*), where the divine operation is most striking, for the imposing ceremony or the exciting dances, which were ordinarily used to induce a state of ecstasy. It is obvious that this emotional contemplation of celestial phenomena could easily pass over into speculation about the nature of these phenomena, and it was no doubt in this way that the practice of purification in the Pythagorean society led to a philosophy of nature.

Pythagoras left his home in the island of Samos, probably some time before 532 B.C., and migrated to the city of Croton in southern Italy, where he founded a society, commonly called the Pythagorean Order, which came to be both a religious and a scientific organization. The members of the Order were reputed to have a double set of

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purificatory rites, one for the body and one for the soul, the latter consisting of philosophical inquiry;¹ and the reward held out for faithful performance of these duties was an early release from the cycle of reincarnation, so that the soul could "follow god" and regain the divine estate from which it had fallen. There was thus latent in these doctrines not merely the customary bond between morality and religion, but a further union of these two with philosophy. Convictions about the principle which regulated the world suggested a certain human attitude toward that principle, since men were a part of the world; and thus arose the suggestion that philosophy was "a way of life." It is sufficient here to remark that as early as Pythagoras Greek philosophy connoted an ethical attitude and expressly attempted to satisfy an ethical impulse.

It is difficult to speak even in terms of probability about the original Pythagorean view of the world and its workings, because so little is definitely known on the subject. No work by Pythagoras is mentioned by later writers, until we come to the age when forgeries were popular; and it is probable that, like many of the greatest teachers, Pythagoras developed his ideas by oral instruction and never wrote anything. The whole course of tradition, however, assigns to the Founder of the Order the idea that the world is explicable in some way by the operation of two bodies called Limit and Unlimited. The latter of the two, as we gather from Aristotle,² was identified with boundless breath which existed outside the world, and which, when inhaled by the world, keeps the parts of the world separate from one another. In another passage, Aris-

¹ Aristoxenus *DFV*, p. 282, 44. On philosophy as "music" cf. Plato, *Phaed.* 61 a 3, *Char.* 157 a 3 (on Zalmoxis, who was said to have been a slave of Pythagoras, *Herod.* IV, 95), and *Strabo* X, 468.

² *Phys.* IV, 6. 213 b 22, 23.

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totle employs the same idea in describing the Pythagorean view of creation as the differentiation of an original mass by the introduction of air (Unlimited) from the outside.³

If then the Unlimited is to be identified with the boundless breath or air, which was also thought of as functioning like a void, what was the Limit? The natural interpretation would suggest that it should be the substance which was broken up by the introduction of the void. But if we suppose that the last part of Parmenides' poem is at least fundamentally Pythagorean, then the opposition there maintained between Fire and Night must correspond to Limit and Unlimited. Now it is well known that air, mist, and darkness were considered as forms of the same natural element,⁴ so that it is easy to identify the Night of Parmenides with the Pythagorean Unlimited. That leaves Fire to be assigned to Limit and to be thought of as the element which formed the mass of the heavenly bodies. These bodies were described by Parmenides as rings of fire; that is, the parts of the world, such as the sun, the moon, and the stars, were believed to be masses of flame. This was also the theory of Anaximander and of Anaximenes, and with the Milesian cosmology in general the Pythagorean seems to have been closely connected. We find the same idea moreover in a somewhat modified form in the later Pythagorean doctrine of the central fire.⁵ From these indications it seems probable that Pythagoras believed the

³ *Met.* XIV, 3. 1091 a 14. cf. Philolaus, frags. 7, 17.

⁴ Schmidt, *Synonymik*, 35. Note also that Parmenides (frag. 8, 59) described Night as a "thick and heavy body," which Aristotle (*Met.* I, 5. 986 b 34) identified with earth. Thus earth, mist, darkness, cold, and air belonged together in the early view and were "opposed to" the fire of the heavenly bodies. For this reason the earth was believed to be quite different from the heavenly bodies, and the phenomena of its atmosphere distinct from celestial movements—a view which formed the basis for Aristotle's separation of the celestial and the sublunary.

⁵ RP 81.

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heavenly bodies to be formed of fire, and that he identified fire with Limit. We should accordingly make our interpretation of his cosmology as follows: there were originally two bodies or things, one of fire and the other of air; the former, which was active, drew in the surrounding air and so separated off from itself parts which were successively inclosed in portions of air; and this air, which is also a void, keeps the parts of the world separate.

If this reconstruction of Pythagorean cosmology is correct, it means that Pythagoras, like the last two Milesian philosophers, based his explanation of the world on a fundamental opposition between two elemental bodies; but that, unlike his predecessors, he thought of these opposites as ultimate and did not attempt to reduce them to an underlying unity. This doctrine is usually called the Pythagorean dualism. But spontaneous motion (inhalation) was attributed to one of these opposites, Limit or Fire, and this body was no doubt conceived as a material divinity, in the same way as the Milesians had conceived their principles. The other Pythagorean principle, Unlimited or Air, was apparently not endowed with activity. Hence the opposites, though both ultimate, were disparate in cosmological causation.

According to a wellnigh unanimous tradition, Pythagoras not only devoted himself to a study of numbers and developed arithmetic and geometry to a high point, but also in some mysterious fashion interpreted his cosmological views in mathematical terms.⁶ This mathematical cosmology seems to have centered about a figure called the tetractys, and especially the tetractys of the decad, which may be represented thus $\cdot \cdot \cdot \cdot$. The dots stood for numbers, in the same way as they do on dice;

⁶ Stob. 1, p. 20, 1; Arist., *Met.* I, 5. 985 b 22-986 b 8.

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and the figure thus presents the series of natural integers up to four, the sum of which equals ten. In later times many significant features of the decad were advertised, and ten was held to be a perfect number, so that "according to nature" all people, whether Greek or barbarian, count up to ten and then start over again. The tetractys of the decad was attributed to Pythagoras himself by his followers, and they used it in the oath by which they swore: "By him who gave our soul (*al.*—tribe, head) the tetractys, which has the source and root of ever-springing nature."⁷ This oath, in spite of the Doric forms of its words, which are no doubt due to later generations of the Order, has every internal indication of being very ancient; for the concept of an "ever-springing nature," about which the important question was its "source" or "root" (that *out of* which), is almost certainly anterior to Empedocles, and bears a very strong resemblance to the Milesian point of view. We must ask then in what sense the tetractys of the decad contained the root of nature, or how this mathematical formula could be used to express a cosmological doctrine.

In answering this question, it is important to bear in mind that the Greeks did not have a zero in their arithmetic—their numerical series commenced with one, and Aristotle said that it is the essence of one to be a starting-point of number.⁸ Moreover there seems to have been a general assumption that numbers were things. That is no doubt a very primitive view, in line with the notion which was implied in many practices of ancient magic, that names are real things and form a substantial part of the

⁷ Theo Smyr., p. 97, Hüller; Proclus in *Plat. Tim.* 155 c, d; Porphyry. *Vit. Pyth.* 20; Iambl. *Vit. Pyth.* 150.

⁸ *Met.* V, 6. 1016 b 18. On the significance of zero, see Whitehead, *Introduction to Mathematics*, p. 63.

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persons to whom they belong.⁹ It was this assumption, that numbers are things, which permitted the early Greek mathematicians to identify the number one with a point, which gave rise to the later metaphysical puzzles concerning the substance of unity, and which also formed the foundation of the Pythagorean doctrine that "the whole heaven is harmony and number."¹⁰ Now if you start with a real one or solitary unit, you would have to divide it to get two; and two would therefore represent a differentiation of the original one. Three and four likewise would result from further differentiations, and so on up to ten, when the process begins afresh. It is this process which we must suppose to be symbolized in the tetractys of the decad. The tetractys pictures the series of natural integers as a system produced by successive differentiations from an original one. And if this original one is identified with the original mass of fire, as it existed in the beginning, the cosmological process assumed by Pythagoras may be described as the progressive splitting up of the initial mass by successive inhalations of air or void.¹¹ At each stage a portion of the first body was separated off, to use Anaximander's phrase; but we do not know how many such stages Pythagoras assumed. It would seem likely that he should agree with Anaximander on this point also, and posit four cosmic bodies—the sun, the moon, the stars, and the earth; but later members of the Order assumed ten revolving bodies. Be that as it may, the tetractys of the decad, which has the root of nature, is to be interpreted as a formula representing the cosmological process as a

⁹ cf. Jevons, "Greco-Italian Magic," in *Anthropology and the Classics*.

¹⁰ Arist., *Met.* I, 5. 986 a 3.

¹¹ It should be noted that for Pythagoras there was no question of the creation of the original one, about which Aristotle complains; it was not created, but was that which existed at the beginning.

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progressive and systematic differentiation of an original unitary mass.

Pythagoras is also represented as having busied himself with musical harmony and as having discovered the numerical ratios between the four stationary notes of the lyre.¹² Here again our sources of information are so defective that we cannot tell how this momentous discovery was made; but it is possible to show that the same considerations which were apparently used to interpret the cosmological process and the series of natural integers might also be applied to harmony. At the time of Pythagoras, the Greek lyre had seven strings of equal length; but his discovery of numerical ratios probably related only to the four so-called stationary notes, which we may think of as low Mi, La, Si, and high Mi. Of course, he had no means of measuring either tension or rate of vibration, and he must have worked by comparing lengths of string. If he took a string (say 12 inches long) that would produce low Mi, and stopped it a certain distance (3 inches) inward from either end, the remainder of the string (9 inches long) would give La, and the ratio between the two lengths would be 12:9. Another distance (1 inch) in the same direction would give Si (12:8); and still another (2 inches beyond Si) would give high Mi, an octave (12:6) above the original note. The original string has thus been successively "limited," and each new limitation represents a definite differentiation of the original unit. Thus the production of these musical harmonies may be viewed as the successive differentiations or limitations of an original unit, in the same way as the

¹² For further information see P. Laloy, *Aristoxène de Tarente et la musique de l'antiquité*, p. 49; Smith's *Dict. of Antiquities*, s.vv. "Lyra," "Musica."

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heavenly bodies represent successive limitations of an original mass of fire, and the natural integers represent successive divisions of an original unit.

It is now possible to surmise the significance of the Pythagorean terms, Limit and Unlimited, in their cosmological sense. The Milesians had not been satisfied with the contest of opposites, which seemed to be the most obvious feature of nature, and their dissatisfaction had induced them to posit an ultimate substance out of which the opposites came; Anaximander had described the cosmological process merely as a separating off, but Anaximenes had attempted to show that it was a separating off that was also a rarefaction and condensation with a quantitative aspect. Pythagoras agreed that it was a separating off, but held that it was only a quantitative limitation. The parts of the world, according to Pythagoras, are fragments broken from an original mass and separated by air, so that each successive fragment represents a further limitation of the original whole. Since the process is a purely quantitative one, it can be described mathematically; and for the same reason each stage has a definite relation to preceding stages and to the whole, so that the world is a harmony. It is not in any sense a harmony of opposites; it is rather a harmony of different portions of the same thing, as in the series of natural integers and the string of the lyre.¹³ Hence Pythagoras could do away entirely with the notion of Injustice and a contest between opposing bodies, first because his opposites did not "oppose" each other in Anaximander's

¹³ I therefore believe it is wrong to explain the early Pythagorean *ἀπουσία* as *κρᾶσις*; the former refers to a system of things which keep their individualities, while the latter implies a blending of differences. Also I doubt the genuineness of the medical doctrines sometimes attributed to the Founder—they are more likely after Alcmeon than before him.

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sense, and secondly because the material parts of the world were related harmoniously to one another. Thus Pythagoras thought of natural regularity, not as a Justice that compensates for Injustice, but as a mathematical harmony. And finally since the world was harmonized in this sense, it could be called a cosmos or orderly collection of parts, like an army in array. It can hardly be doubted that Pythagoras was the author of the cosmos-idea; and the essence of Pythagorean cosmology seems to be contained in these notions of limit, harmony, and cosmos.¹⁴

Exactly how these cosmological doctrines were related to the religious side of Pythagoreanism is a question that has greatly vexed historians, and which, with the evidence at present available, admits of no final answer. It would appear, however, that the whole notion of purification by devotion to philosophy would have been meaningless and absurd, unless by means of this philosophical activity the soul of the inquirer was led into the presence of god. Where then is god to be found in the Pythagorean cosmology? It can only be in the figure of Limit or Fire, the active principle, whose operation was described in the tetractys of the decad. If objection is made to this interpretation on the ground that it leaves the Unlimited out of account, I should reply that the Unlimited or Air was

¹⁴ I do not believe that Pythagoras was the author of the doctrine that things are numbers. This doctrine is an extreme form of the number theory, which would seem to follow most naturally after Philolaus' doctrine that things have number; and it can in fact be attributed with great probability to Eurytus, a disciple of Philolaus. cf. Theophr. *Met.* VI a 19, Usener; and for Philolaus see below, chap. VIII. It seems to me an anachronism to make Pythagoras interested in "things"; he was interested in "the source and root of ever-springing nature." The interest in "things" came in with Empedocles and is found in Philolaus, cf. below, p. 134, note 3. Most of the evidence ordinarily offered for the doctrine that things are numbers really supports only the doctrine that numbers are things, which is quite a different matter and which I fully admit as underlying the earliest form of Pythagoreanism.

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apparently confused with a void; that almost certainly Limit alone was represented as active, and self-activity was, as we have previously seen, the prime characteristic of divinity; and finally that it was perfectly conceivable for the Greeks to have two ultimates and identify one of them with god, as Empedocles and Aristotle show.

3. Xenophanes, like Pythagoras, left his home (Colophon) in Ionia, and went to western Hellas. There was a story that he settled at Elea in Italy and founded the Eleatic School of philosophy; but that story rests on doubtful evidence and is difficult to reconcile with other data about him as well as with our knowledge of Eleaticism. Probably he lived mostly in Sicily, but settled nowhere permanently and founded no school. Indeed he was not primarily a philosopher at all, but a poet who wrote elegies and satires. The remains of these poems, however, indicate that the author was a poet with a "message," and the burden of his song was an attack on the decadence of Ionian civilization. In attempting to work a reform, he was led to oppose the traditional view of the gods and to propose certain positive views of the world, which have considerable philosophical interest.

Xenophanes' opposition to the traditional notion of the gods appears to include two main considerations: first, that Homer and Hesiod, who were the chief sources of this notion, had ascribed to the divine beings actions that were judged immoral when performed by human beings; second, that this view involved an anthropomorphism, so that the Ethiopians made their gods black and snub-nosed, while the Thracians assumed theirs had blue eyes and red hair. This last statement indicates that the author had in mind not merely the Greek, but the general notion of gods, which was current in the polythe-

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istic religions of the nations with which the Greeks were in contact. Now in interpreting Xenophanes, we are apt to read into his statements our own modern point of view, and to understand him as attacking the ordinary religious beliefs *because* they involved anthropomorphism; but his statements are not framed in this way, and such an interpretation of them is at least questionable. In his day every educated person knew that the poets sang about the thefts and adulteries practised among the Olympians, and no doubt accepted such tales as a matter of course—the gods were after all gods, and there was no ground for supposing they were subject to the restrictions which seemed desirable among men. If Zeus stole or committed an act of lust, that was no reason why mortals should have such liberties. And as for each race of men picturing its gods in a racial resemblance, what was strange about that as long as the gods were gods of particular races? If the Thracians had gods who were gods of the Thracians and not of other peoples, it was eminently natural to believe that these divine beings were characteristically Thracian. No one needed Xenophanes to establish such well-known facts, and Xenophanes could not use these generally accepted practices in and of themselves as reasons for an attack on religion.

Why then did he make these statements? The answer would seem to be because he wished to contrast these views with another view which he held to be better, and of which some features have been preserved in the extant fragments of his poems. In contrast with the many gods who were limited each to a particular race, Xenophanes put “one god, the greatest among gods and men”; in contrast with gods who were pictured in the voice, form, and even clothes of a human tribe, Xenophanes set a god

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who was "like mortals neither in form nor in thought" and who ruled the world merely "by the thought of his mind"; and against the poetic tales in which gods went about committing all manner of immoral deeds, Xenophanes held that god "stays always in the same place, moving not at all, for it does not befit him to go about hither and yon." It is thus quite evident that the author had in mind a new notion of divinity, which he wished to substitute for the traditional view—a notion of one great god, the ruler of all things, whose very nature and dignity made preposterous the vulgar tales of divine society.

We must then ask from what source Xenophanes had derived this new idea of god, and what reasons he could give for commending it in opposition to the traditional religion. The answer to each of these questions is the same. The extant fragments of his poems have preserved several statements of a cosmological character, and these references together with the doxographical tradition are sufficient to indicate that the author had adopted Ionian science. He seems to have held that the heavenly bodies were clouds ignited by motion, and that all things were ultimately earth and water. We must suppose that he thought of earth and water as primary opposites, in much the same way as Anaximander had thought of the hot and the cold. When therefore Xenophanes speaks of one god, we must follow Aristotle in holding that he meant the world. We do not know how Xenophanes explained the creation of earth and water from the world-whole, and there appear to be several inconsistencies in the cosmological theories attributed to him by the later tradition; but let us not forget that we are not dealing with a cosmologist but a poet, and the information we already have is sufficient to mark the philosophical significance

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of the author. Xenophanes got his idea of god from science, and he supported this idea by scientific explanations of facts which had hitherto been ascribed to mythological personages.

The real point of Xenophanes' work tends to be overlooked by modern readers unless they keep clearly in their imagination the contrast that he meant to draw between his own and the traditional views. If Iris (the rainbow) is really a cloud formed from the sea, Homer's picture of her as the messenger of the gods seems like pure fancy. If the sun is really a collection of sparks, it is difficult to imagine it as a divine person. And if the world is one great god, the whole Olympian fraternity seems unnecessary. Xenophanes meant to substitute the scientific point of view for the traditional one, through the implication that when science has explained a thing, it is impossible to think of that thing in any but a scientific way.

One final remark needs to be made. In the writings of Xenophanes, the modern departments of science, religion, philosophy, and morality, are inextricably interwoven. He believed the life of his fellow Ionians was decadent and unprofitable, *and* their religion was improper. He did not say that their mode of living was partly the effect of their religion; but the reason he did not say so was because he could not abstract the one from the other. He believed also that science pointed to a god totally unlike the gods of traditional religion and mythology, but he still believed that men should "worship god with joy." It would be a great mistake to suppose that the work of Xenophanes and early Greek cosmology as a whole were either pure science or pure philosophy in our sense of the words, and a still greater mistake to imagine that they had no reference to religion and morals. We may well

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hesitate to call Xenophanes a monotheist, because that term carries associations for us which it did not have for him; and yet it cannot be denied that he represents the transition from tribal polytheism to a unified, cosmic religious attitude. We may also legitimately refuse to regard him as an ethical philosopher, and yet we must admit that his writings unite a view of the world with a view of life.

CHAPTER IV

HERACLITUS

1. HERACLITUS was a native of Ephesus, and so far as we know he remained at home and did not, like Pythagoras and Xenophanes, emigrate to the West. He had heard of their doctrines, for he mentions them by name; and we have already seen that all three of them had certain fundamental points of agreement in their thinking. But his philosophical activity was probably later than theirs, and would fall mainly in the first years of the fifth century. He put his ideas in writing, and sufficient fragments of his work have been preserved to enable us to make out the main features of his system without the reliance on later tradition which is necessary in the case of the Milesians and Pythagoras. He wrote, however, in an oracular fashion, expressing his thoughts in short, epigrammatic sentences, with the result that his meaning is frequently obscure and he gained the nickname of "the Dark."

2. It is abundantly clear that Heraclitus was conscious of the quality of his style; and he appears to regard it as the appropriate vehicle of his thought. No doubt this style was partly the expression of his individuality, which was marked, and partly due to the spirit of the age; but it also seems to have a philosophical significance. This manner of writing was quite different from all ordinary prose, and Heraclitus is at pains to dissociate himself

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from other thinkers, some of whom he mentions by name. Running through all his criticisms of these thinkers there is the idea that they had failed to use their understanding—Homer had prayed for the end of strife and had not understood that this would mean the destruction of the world; Pythagoras had practised scientific inquiry and knew many things, but his knowledge was not genuine understanding. And so, speaking in general, Heraclitus says: "Of all whose discourses I have heard, not one has advanced so far as to understand that wisdom is separate from all things" (B 18, D 108). For the same reason also he despised the common people, who never really thought and who acted as if they were asleep. He seems therefore to feel that a true understanding demands digging down beneath the surface of things to a hidden truth, which no one else had found; and that wisdom is to be gained by penetrating insights, such as characterized the utterances of the Delphic oracle.

Consonant with this attitude are certain remarks which he makes on the subject of experience by the senses. "Eyes and ears are bad witnesses to persons who have untutored (*lit.*, barbaric) souls" (B 4, D 107). Again and again the author contrasts understanding or wisdom with the testimony of the senses, the mere learning of many things, or scientific inquiry; and the fragments of his work leave no room for doubt that he neither was nor wished to be a scientific investigator. Sense experience, knowledge of many things, and scientific inquiry were characteristic of the common herd, the poets, and previous investigators, all of whom, as we have just seen, Heraclitus condemned. It can therefore hardly be questioned that he meant to distinguish understanding from mere sense experience, that he connected the former directly with the soul, and

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that he thought of it as superior to the latter. There is no warrant for attributing to him any more definite psychology than that; but that much is philosophically important as indicating that thus early in the development of Greek philosophy a distinction, rough and vague as it may have been, was made between the evidence of the senses and a higher faculty of the soul.¹

3. What then does the understanding of Heraclitus discover when it penetrates below the surface of things? It discovers that underneath all the apparent multiplicity and strife there is a hidden unity and harmony. But this doctrine of unity is not merely an explicit rendering of the implication which had been present in the thought of the Milesians and Xenophanes—if it had been only that, there would have been no reason for Heraclitus to condemn his predecessors so roundly. What he meant by unity was that the various separate things in the world were really not separate and distinct from one another, but all one. Anaximander had taken his stand on the evidence of sensation when he maintained that there were “opposites,” like the hot and the cold, and that one of these opposites could never be reduced to the other—hot was not cold and never could become cold. But Heraclitus maintained that if you used your understanding with your senses, you would see that opposites do precisely what Anaximander suggested they could not do—they pass into one another. “Cold things become warm and the warm cools, the wet dries and the parched is moistened”

¹ This may well be taken as the beginning of the tendency to distinguish between qualities directly sensed and qualities inferred by reason, a tendency which produced the sensible and the intelligible “worlds” in Plato, led to the doctrine of secondary and primary qualities in early modern philosophy, and has lately reappeared in the writing of scientific philosophers; cf. Whitehead, *The Principles of Natural Knowledge*, chap. vii; *The Concept of Nature*, chaps. i, ii.

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(B 39, D 126). In the doctrine of Heraclitus the unity of the world involves the passage of opposites into one another, a conception whose absence, he believed, had vitiated all earlier explanations of the world.

4. It is evident that if things pass into their opposites, the world must be in a continual flux, and that is the conclusion which Heraclitus drew. The appearance of stability in things is an illusion of the senses, which must be corrected by the understanding; and the understanding shows that a thing is not permanently fixed and stereotyped against its opposite, but is inevitably destined to pass into it. All things are changing, and the whole is like a river which is never the same on account of the flow of fresh water (B 41, 42, D 12). The world is a process.

5. Now a continual flux of all things would by itself be a mere chaos, and as the world is not a chaos, there must be some principle which unifies and regulates the changes. Heraclitus believed in the first place that all the petty changes which are visible in different objects could be reduced to the transformations that occur between three gross substances, earth, water, and fire. In studying the Milesians, we have seen that they believed they perceived certain qualitative transformations between various materials, which later investigations proved to be illusory; and we therefore need not be surprised to find Heraclitus assuming the same kind of changes. In fact he seems to have held that earth is liquefied so that it turns into water, and that the sea gives forth exhalations which feed the fire in the sun and the other celestial bodies; and on the other hand, the fire of the sun appears in the fiery storm-cloud which produces water, and water turns to earth, as happens in the case of alluvial deposits. It will be seen that these transformations form two regular series,

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first that from earth to sea to fire, second that from fire to sea to earth; and as Heraclitus localized the fire in the heavenly bodies, especially the sun, he called these two series of transformations "the upward and the downward path." He thus held that all changes are explicable by the transformations of materials in the upward and the downward paths.

6. But there was still something that needed explanation, and that was how the three gross elements, and indeed all objects, could give the appearance of stability and permanence, if they were really continually changing. Heraclitus met this problem by the theory that every transformation involves a "measure," and is matched by a transformation of equal "measure" in the opposite direction. Thus in proportion as the earth turns into sea, the sea turns back into earth; and in proportion as the sea gives off exhalations to the celestial fire, it receives fresh complements of water from the heavens; so that at any moment, the sea, for instance, has one part changing into fire and another part changing into earth, but still maintains its individuality by exchanges from the other two substances. But apparently Heraclitus did not hold that the measures which governed all transformations were absolutely fixed, but supposed on the contrary that they varied within limits; and in this way he accounted for the alternation of day and night, winter and summer, and phenomena of that variety.

This Heraclitean conception of measures is philosophically significant as a fresh attempt to appreciate natural regularity. Anaximander had argued from the alternation of sensibly stable opposites, like the hot and the cold, to a law of retribution, compensating for any advance of one opposite over the other, which he regarded

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as Injustice. Heraclitus, on the other hand, seems to suggest that the understanding must interpret this apparent strife of opposites as a harmony of interaction within preordained limits. There is therefore an explicit contrast between the notions of strife and harmony (B45, D51), and a latent contrast between retribution after the fact and preordained limit. This latter contrast corresponds roughly to the difference between the notion of political law as a means of rectifying injustice when committed, exemplified probably in Draco's codification, and the notion of previously defined rights, which is implied in the constitutional reforms of Solon and the later legal structure based upon them.² Thus, when Heraclitus says: "the sun will not transgress his measures, and if he does, the Erinyes, the assistants of Justice, will find him out" (B29, D94), we are to think of these measures as natural law in the sense of preordained principles of cosmic activity.

7. The measures that regulate the constant flux of earth, water, and fire, seemed to point to an ultimate, unifying force; and Heraclitus believed this force was fire. "This ordered world (κόσμος), the same for all beings, no one of gods or men has made; but it was always and is and shall be ever-living fire, with measures kindling and measures going out" (B20, D30). Sea and earth must therefore represent transformations of fire (B21, D31), and fire is thus both the cosmic process of transformation and also one of the stages of the process. No doubt Heraclitus was combining the notions of combustion (process) and of flame (thing), in somewhat the

² cf. Maine, *Ancient Law*, pp. 387-9; Gilbert, *Gk. Const. Antiq.*, p. 125 (and the authorities there quoted), pp. 131-4, 138-40; Lipsius, *Attisches Recht*, II, 1, p. 1; Aristotle, *Ath. Pol.* VIII, 26 Sandys (IX, 1 Blass). For the analogy between social and natural law see above, p. 18.

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same way as a modern physicist might speak of electricity as a mode of behavior of matter and as electrons, only it is doubtful if Heraclitus clearly distinguished the two notions. It is only fair to him to recognize that if everything is in flux, not even fire can be excepted, so that the "thing" called fire must be in the end only a stage in the ultimate process. Yet it can hardly be doubted that a confusion of thought lurks behind the phrases in which Heraclitus speaks of his principle, and that this confusion is due to the fact that he had only partially freed his mind from the old notion of the principle as the material *out of* which present forms have arisen.

8. If the world is really a unified process whose essence is fire, then not only do opposites pass into one another, but they are identical. From the cosmic point of view of the understanding, opposites are transformations of the same fire and are passing through the same process, and even the upward and the downward paths are one and the same (B69, D60). Heraclitus never tires of asserting the identity of things which are ordinarily considered opposites—day and night, winter and summer, life and death, harmony and discord, and even good and bad. These assertions can only be intelligible as implying the ultimate unity of the world and as based upon the distinction between sense experience and understanding; that is, opposites are identical only for the understanding and only because they are ultimately the same cosmic fire. Professor Burnet holds that Heraclitus did not mean "that good is evil or that evil is good, but simply that they are two inseparable halves of one and the same thing" (p. 166); but Heraclitus might well maintain that the two halves are the same thing. His meaning can be made quite clear by putting his statement that "to God all things are fair

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and good and just, but men hold some things unjust and some things just" (B61, D102) together with the other statement that "the character of man has no wisdom, but that of god has" (B96, D78). The distinction between good and evil, which is typical of all opposites, is sensible to beings who lack wisdom and understanding, but disappears for god and the author, who have understanding of the cosmic unity. Hence the real unity of the world involves not only the passage of opposites into each other, but also the final identity of opposites for the understanding; and the full appreciation of this fact is the ground for the author's attitude of superiority toward previous thinkers and the common people.

9. If we ask why Heraclitus selected fire, rather than sea or earth, for his principle, we get no direct answer from him; but we may be sure it was in general because of the three things fire alone could perform the functions required by the system. More specifically the notion of constant activity implied in the flux was not associated with earth, and the notion of intelligent self-direction implied in the cosmic harmony was not associated with sea; while both these attributes were connected with fire through the intermediate notion of soul. Probably many features of the principle, as Heraclitus conceived it, were based upon an analogy between macrocosm and microcosm, which was generally presupposed in Greek philosophy; and a study of the author's conception of the human soul will thus facilitate an understanding of his cosmic principle.

It is evident that Heraclitus had advanced beyond the Homeric idea of soul as a shade which only came into being at death, and that he believed in a soul that was the principle of life in the body. When he says: "it is diffi-

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cult to fight with desire, and yet that which it wishes it buys at the cost of soul" (B 105-7, D 85), he must be thinking of soul as a force at work in living bodies; and it is natural to suppose that this idea was at least partially the result of the mysteries, which had such a profound impression on Pythagoras. Moreover, we have already seen that Heraclitus connected understanding directly with the soul, which must therefore be considered the principle of real knowledge. Finally there can be no doubt that he identified the soul with fire, and thought of it as an epitome of the cosmic principle. "It is death to souls to become water" (B 68, D 36), because souls are fire, and in general life, sleep, and death correspond to fire, water, and earth respectively.³ "The dry soul is the wisest and best,"⁴ because the soul is fiery by nature and can best exercise its faculty of understanding when in its naturally pure condition. In short, the soul of man was for Heraclitus the principle of intelligent self-direction, in the form of fire in the body.

It is impossible to get from the extant fragments the author's idea of the relation of human souls to the cosmic principle of fire; but he speaks as if they were fractions of the whole. Probably at death a soul might take the downward path to earth and lose its individuality, or it might continue its separate existence in another shape as a guardian demon of the living and the dead (B 123, D 63), the issue being determined by the character manifested during life. "Gods and heroes" are no doubt souls who have justified their semi-independent life, and from this point of view they are the same as mortals (B 67,

³ Burnet, *Gk. Phil.* I, p. 60.

⁴ B 74-6. The reading is doubtful. Diels (118) has: "Dry light is the wisest and best soul."

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D62). Moreover several of the fragments suggest a belief in reincarnation, which would be simply the reverse of the process from life to death.

10. After this we shall not be surprised to find that Heraclitus thought of the cosmic fire or principle of the world as soul and as god. "You could not find the limits of soul by travelling, so deep a measure has it" (B71, D45)—this is intelligible if soul is the immanent principle of the world. "The wise alone is one, and it is willing and unwilling to be called by the name Zeus" (B65, D32)—this must mean that the principle is the only unity in the world, that it is endowed with wisdom, and that it can be spoken of as Zeus, if that epithet does not suggest the whimsical personality who goes by the name in Homer. And so for human beings, "wisdom is one, to know the thought which steers all things through all things" (B19, D41). The fire which is the principle of the world is god, because it has the capacity for spontaneous movement; and it is soul, because it is intelligent.

11. It is obvious that several features of Heraclitus' cosmological doctrines had ethical implications, and three of these are important enough to deserve our attention. In the first place, after the emphasis Heraclitus has placed on the understanding, both as a means of gaining true knowledge and as an attribute of god, we are not surprised to find him saying that "understanding is the greatest virtue, and wisdom is to speak true things and to act heedfully according to the nature of the world" (B107, D112). From its inception in Miletus, cosmological inquiry had been predicated upon an impulse to explain and to understand, and in the Pythagorean practice this inquiry had apparently been held up as the best way of life; but it was Heraclitus who first explicitly maintained that

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understanding was the chief virtue or excellence of man, and that knowledge of the principle of nature suggested a life in accordance with the operation of this principle. In the next place, Heraclitus believed that as the principle of the world, fire or soul, was the hidden unity that underlay the apparent diversity of all things, it was in reality "common" to all things, and to live according to nature is thus to "follow the common" (B92, D2). But to live according to nature is wisdom or understanding on the part of men, and the common principle of the world is the divine thought which steers all things, so that the injunction to follow the common means that the thought of men has the capacity of direct communion with the divine thought. It can hardly be doubted that in these ideas Heraclitus had been influenced by the mystical doctrines. Obviously too it was only through the understanding, or (in physical terms) a perfectly dry condition of soul, that men could appreciate the divine wisdom; and this leads the author to condemn the crowd, who live as if they had a private or uncommon wisdom, and wanton seekers after pleasure, whose souls are cut off from the common wisdom just as much as if they were asleep. Heraclitus also believed that the common was embodied in the constitution of a city, and he accordingly urged the people to fight for their laws as for their walls (B100, D44).

In the third place, for the understanding even the distinction between good and evil disappears; and as Heraclitus held that men had the capacity to understand, he may have believed that it was possible to advance to a position where the distinction between good and evil was meaningless—at least he himself had advanced to that point. But he does not develop the thought further. This

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reference to a condition beyond good and evil, together with the doctrine of the common, and the emphasis on wisdom, indicate plainly enough that presocratic cosmology was not without an ethical interest.

12. Finally there is a logical aspect of Heraclitus' thought, which must be noticed. In one way or another we have seen him identify the principle of the world with fire, god, soul, understanding, law, and virtue. These latter are not described as different aspects or rôles or forms of the one principle, but the principle is said *to be* these various things. It is evident that such usage, as well as the identification of opposites, raises the question of the ultimate significance of predicates, and in general of the nature of thought. On this point Heraclitus had nothing to say, but it was on this point that he was attacked by the next philosopher, Parmenides.

CHAPTER V

PARMENIDES

1. PARMENIDES was a native of Elea or Velia, a Greek colony on the southwestern coast of Italy. His date is quite uncertain, but he probably lived through the first half of the fifth century B.C. There was a story that he had been a pupil of Xenophanes, and another to the effect that he had been associated with a Pythagorean; the latter may very well be true, for there are Pythagorean elements in his doctrines, but the former is very doubtful. Parmenides was either the founder or the chief figure of a school of philosophy, known as the Eleatic and numbering among its members Zeno, the author of the famous paradoxes. Parmenides set forth his philosophy in a poem, large portions of which have been preserved; but the metrical form was not a happy experiment, and Parmenides seems to have had very little poetry in his soul.

2. The understanding of his view of the world is complicated by the fact that it seems to be double, one complete system being expounded in that part of the poem called *The Way of Truth*, while another and incompatible interpretation is sketched in *The Way of Opinion*. The difficulty is made specific by the author's own statement that the former of these Ways contains the true account of the world, while the latter is false and deceptive. That being the case, why did he set forth a worthless doctrine, after giving the true one? And so some historians

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of philosophy have refused to accept literally the author's expressed judgment of *The Way of Opinion* and have attributed to it a measure of truth, while others have taken his words at their face value and have busied themselves with reasons why he should publish this false theory.

3. The poem commences with an apocalyptic Introduction, the significance of which constitutes another, though a minor, problem for the historian. But we shall leave this for the present, and turn straight to *The Way of Truth*, in which the author professes to develop the true account of the world. Here we seem to be in quite a different intellectual situation from that which was characteristic of the previous thinkers. We seem to start with a concept called *What-is*, whose content is never filled in with objects of experience, but which evidently refers to the world as a whole. Its existence is said to be necessarily implied by thought. Its attributes also are not derived from perceptions, but are deduced as corollaries of the bare concept itself. This method of exposition finally yields a conclusion to the following effect: *What-is* (the world) must be and is an uncreated, indestructible, immovable, indivisible, finite, spherical continuum.

4. The first thing to notice is that Parmenides seems to be aware of the novelty of his method. At the end of the Introduction, he prepares his readers by stating that what is coming is to be regarded as a "proof," which they are to judge by reasoning or argument; and *The Way of Truth* opens with an exhortation to use the mind. This intellectual procedure is contrasted with the habitual inquiry by eye, ear, and tongue;¹ and the contrast reminds us of

¹ frag. 1, lines 33-6. Burnet, p. 173, n. 1, points out that Parmenides was the first to use *λόγος* in the sense of (dialectical) argument. It is important to realize that what Parmenides meant by the term was a new thing in Greek philosophy.

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that which Heraclitus drew between the understanding and the senses, but it turns out to be quite different. The basis of the distinction is the same for both authors, namely between the mind and the senses; but in Parmenides the mind yields a truth that is *proved*, and this proof is the feature which is new.

The previous systems of cosmology started with empirical facts, like combustion (Heraclitus), or evaporation and condensation (Anaximenes and possibly Thales), or the obvious changes produced by the interaction of two physical elements (Anaximander and probably Pythagoras). These primary facts were used to explain other phenomena or supposed phenomena by analogy, and this use resulted in formulae for water condensing into earth and stones (Anaximenes), wind arising from sea (Xenophanes), fire turning into sea and sea into fire (Heraclitus). These secondary principles are to be considered as theoretical extensions of experience, or analogical generalizations from observed facts. On top of them there is a third stratum of pure theory, chiefly on the subject of creation, like the supposition of Anaximenes that from air "gods and things divine took their rise, while other things come from its offspring," or the doctrine of Heraclitus that god is "the thought which steers all things through all things." These theories were probably also analogical, though they seem to us to be so far removed from any premisses in experience that it is impossible for us to reconstruct their derivation with any assurance. [But we may at least think of the pre-Parmenidean systems as composed of a basis of empirical fact, a middle layer of analogy, and a crown of speculation.]

If we now turn to The Way of Truth, we shall find that the foregoing description will not apply to it. It starts

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with no observed phenomena, it contains no appeals to facts in support of its conclusions, and its thought is not developed by analogical processes. Parmenides seems to start with the concept of What-is, which we must regard as an intuition referring to the whole of what exists. He then proceeds to manipulate this concept by analysis and synthesis, in a series of logical processes which sometimes seem like syllogistic reasoning, while at other times they are little more than immediate inference.² All the arguments stick so closely to the central concept of What-is that they are interdependent to a high degree, and it is no doubt this feature that leads the author to remark: "It is all one to me where I begin, for I shall come back there again" (3). The process is, however, inferential, and in this respect is to be contrasted with the method of previous thinkers, which consisted in making a principle plausible by explaining phenomena by it.

5. We must next ask why Parmenides believed the old method of cosmological investigation was erroneous. On this point he makes three important statements: first, this false philosophy amounts to saying that "it is and is not the same and not the same, and all things travel in opposite directions"; second, it depends on the existence of What-is-not; third, it is the belief of stupid mortals.³

The first of these indictments must refer specifically to Heraclitus, and it can only mean that Heraclitus had reduced philosophy to nonsense by affirming that a thing is identical with its opposite. We may recall such fragments of the Ephesian thinker as "Mortals are immortals," "The way up and the way down is one and the

² "Vraie géométrie de l'Etre," Croiset, *Hist.* II, p. 524.

³ frag. 6, ll. 8, 9; frag. 4, l. 5, and frag. 7; frag. 6, ll. 4-6, and frag. 8, ll. 51, 52.

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same," and "It rests by changing." Parmenides makes the point that if things are identical with their opposites, then everything is only a name which has no object corresponding to it.⁴ On this basis thought cannot operate, for thought must have some definite objective reference—"something that is, as to which it is uttered" (8). Hence Parmenides lays down a principle: what can be thought and what can be are the same (5). But this principle has a positive and a negative form. Positively, it means that what can be thought is (6); that is, a true thought carries the implication of an object which is possible and necessary and real. Thus truth is the concern of mind or thought, rather than of the senses; and what is thinkable and can be proved has an object which exists.

The negative form of this principle leads to the second of the three points mentioned above. If what can be thought and what can be are the same, then what is not cannot be thought, that is, it is unthinkable (4). There is also the implication that what cannot be thought as true does not exist and is nothing.⁵ Now when Parmenides speaks of What-is-not, he must be referring to empty space, which had been implied by Heraclitus and earlier thinkers in their accounts of change. The error of these thinkers lay in naming two things, a substance like fire, and a medium of change, like darkness or air which was confused with empty space (8, line 53). Now empty space is nothing and therefore cannot be. But if so, then motion is impossible, and coming into being, passing away, change, and alteration are nothing but names which have no reality (8, line 38).

This brings us to the third point. All previous philoso-

⁴ frag. 8, l. 38; cf. l. 53, and frag. 9, l. 1.

⁵ cf. frag. 8, ll. 9, 10 with frag. 6, l. 15.

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phers had employed the notion of change, and in fact it is a common notion of all mortals. Heraclitus had merely carried the idea to its logical conclusion, and this conclusion made thought impossible. The Milesians had started with the notion of a changing substance; Heraclitus showed that if the notion of change were logically worked out, it must apply to the substance itself, and then there is no self-identical substance at all—nothing is left but a process. Parmenides therefore turns away from the concept of change, to develop the concept of substance; and he shows that if you work out this concept logically, change becomes impossible. The “beliefs of mortals” thus include all thought which involves the notion of change.

6. We must now examine Parmenides’ conception of truth and reason. From his own statements we have already gathered that truth rested on proof, and reason was the “way” of proving a proposition. Now this view is almost identical with the typical position of rhetoric, and I shall accordingly examine the latter in order to see whether it may not throw some light on The Way of Truth.

Cicero claimed that Aristotle said rhetoric originated in law-suits for the restoration of property, which followed the expulsion of the tyrants from Syracuse about 465 B.C.;⁶ but Diogenes asserted that Aristotle said Empedocles was the founder of rhetoric, and we have reason to believe that Empedocles’ speeches, made in Acragas a few years after the fall of Thrasydeus in 472 B.C., were marked by certain conscious artistic traits which

⁶ *Brutus*, 46.

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Gorgias afterwards developed.⁷ Now these two statements are not far apart, and they indicate that rhetorical devices were being employed in public arguments in Sicily about 470 B.C. We do not know when *The Way of Truth* was composed; but if we accept Burnet's chronology, to which I am inclined, Parmenides would have been forty-five years old in 470.⁸ I see therefore no chronological impossibility in supposing that the Eleatic philosopher was acquainted with the beginnings of rhetoric when he wrote his poem. Nor do I believe the difference in locality makes this unlikely, as there is evidence of intellectual intercourse among the cities of western Hellas at that date.

But it is unnecessary to posit any actual influence of Sicilian rhetoric on *The Way of Truth*—we may regard each of them as typical but independent manifestations of the spirit of Greek civilization in the West. In order to appreciate this spirit, let us recall that during the first half of the fifth century there was displayed at various points in this region great originality in the development of medicine, religion, political constitutions, philosophy, and rhetorical argumentation. Even as early as the time of Polycrates of Samos and of Pisistratus, the Crotoniates had been noted for their physicians;⁹ and in the next century, interest in medicine and physiology was stimulated by the investigations of Alcmeon at Croton, Parmenides at Elea, and Empedocles at Acragas.¹⁰ The spirit of science was also at work in the Pythagorean development of harmonics and geometry, and the biological researches

⁷ Diog. L. VIII, 57 *DFV*, p. 150; Satyrus ap. Diog. VIII, 58; Quintilian III, 1, 8; cf. Diels *Empedokles und Gorgias*.

⁸ Burnet, pp. 169, 170.

⁹ Herod. III, 131.

¹⁰ Wachtler, *De Alcmaeone Crotoniata*, p. 91; Julius Sander, *Alkmäon von Kroton*, p. 7; Parmenides, frags. 16, 17; Empedocles, frags. 61 f.

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and experiments of Empedocles. In religion there was the great vitality and the rapid propagation of Orphicism in southern Italy and Sicily, as well as the more local and more violent rise of Pythagoreanism.¹¹ Furthermore there was a great political ferment in various cities, the most obvious instances being Croton, Syracuse, and Acragas; and though the occasions for these movements seem to have been often disconnected one with another, yet they all appear to have rested on the assertion of democratic principles in some form and to have involved the invention of new political institutions. Finally, we must notice the great originality of reflective thought which was manifested by Xenophanes, Pythagoras, Parmenides, Empedocles, and Zeno, and in rhetoric by Corax, Tisias (or Teisias), and Gorgias. The mere catalog of these various new activities should suggest to our minds the spirit of freedom, the desire for something better, the impulse to invention, which seem to have characterized western Hellas at this time. It would in fact appear that the great originality of the Greek genius, which had heretofore been at home chiefly in Ionia, had now passed to the colonies of Italy and Sicily for a brief but vigorous effervescence, before its various phases were caught up in the culture of Athens.

The particular aspect of this genius in which we are now interested is the new use of reason, which we see in certain writers of this period. It would of course be absurd to imagine that the human mind before that time had been innocent of the process we know as reason; and yet upon a thorough examination of previous literature we are surprised at the primitive simplicity of illative se-

¹¹ Ed. Meyer, *Geschichte d. Alt.*, II, arts. 453-60; Rohde, "Die Quellen des Iamblichus in seiner Biographie des Pythagoras" in *Rhein. Mus.* XXVII, and Burnet, pp. 87-92.

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quences. I have already observed that pre-Parmenidean philosophy seemed content in the main with what might be called analogical generalization, and I have also remarked that with Heraclitus, in whose system the method is most typical, the quality of explanation toward which he implicitly worked was a general plausibility. Now this plausibility always connoted an ultimate reference to an objective fact or set of facts, so that the arguments from analogy were to be judged in the end according to their correspondence with facts. But in Parmenides' Way of Truth there is no specific external situation to start with, but only an idea; and in Tisias' rhetorical arguments the external situation is in dispute, so that the final criterion of judgment is a complicated set of mental factors comprising the general notion of probability. In such cases the appeal to facts was impossible, and judgment had to be based on the inner consistency of the argument. In other words both the philosopher and the rhetorician tried to make you believe something because it was implied in your thinking, without regard to external facts. And that was a new position in Greek thought.

In illustration of the new method, we may cite the typical argument attributed to the early rhetoricians, and several specimens from The Way of Truth. Corax and Tisias are said to have become famous by their use of the argument from probability (*τὸ εἰκός*), and their cases rested in the end on a proposition in the form: "it is likely that . . . (e.g. a small weak man would not by himself attack a big strong one)."¹² Here the appeal is not to an actual, external situation, but to a subjective feeling of likelihood. In The Way of Truth, this argument appears

¹² Arist., *Rhet.*, II, 24 (IX). 1402 a 8; Plato, *Phaedrus*, 267 a, 273; Blass, *Bered.*, I, p. 19; Croiset, *Hist.* IV, p. 40.

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in the expression: "it must needs be that . . .," that is, one must believe that . . .; and the converse is: "it can never be proved that. . . ." The whole argument was a matter of what could be proved, and the proof depended on subjective assent to a logical manipulation of ideas.

7. The next question will concern the validity of reason, as conceived by Parmenides. His appeal to reason had resulted not only in failure to explain any and all phenomena of nature, but also in conclusions violently opposed to all experience and common sense. Change is an obvious and wellnigh universal factor in the world, as we perceive it; and yet reason denied change. What right or prerogative had reason, so that it could deny the plain evidence of the senses?

Here we shall be greatly aided, I believe, by our understanding of rhetoric. We are told that the Sicilian rhetoricians taught their pupils to argue on both sides of any case, and this suggests that they were striving for logical proof rather than correspondence with objective facts.¹³ Yet it must have been as obvious to those gentlemen as it is to us that two contradictory propositions cannot both be right. To be sure, the principle of contradiction had not yet been enunciated, and doubtless theoretical understanding of it was entirely lacking, or Plato would not have been at such pains to go into the minutiae of it much later. But even in the minds of Corax and Tisias, there would have been no dubiety on such a concrete point as that the small weak man either did or did not attack the big strong one. If they were ready to argue both sides of such a case, it must have been because they would be

¹³ In the *Phaedrus*, 272 d 7, where the conversation is on rhetoric, Socrates remarks: "In the law-courts people care absolutely nothing about truth, but only about what will persuade, and that is probability."

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satisfied with a proof which was divorced from appeal to facts.

This surmise is confirmed by Sophistry. The Sophists that we meet in Plato's Dialogues were not mere dramatic fictions; they are at worst caricatures, which must have had some basis in fact to give them point; and for some of them we have independent testimony, which tends to corroborate the main features of Plato's picture. Now these Sophists, on the formal side of their teaching, were the intellectual heirs of the early rhetoricians,¹⁴ and it is noteworthy that Plato often represents them as arguing in precisely the same way as their rhetorical prototypes. For instance, in the *Euthydemus* (283), Dionysodorus maintains that the friends of Clinias, by wishing him to become wise, in reality wish him no longer to be what he is, which means that they wish him to perish. Why was such patently false juggling of ideas tolerated? why did it even seem interesting? It could only be so because of a popular delight in trying to prove anything under the sun; verisimilitude was not the desideratum, and the sole interest lay in seeing what paradoxical conclusion could be proved by the unaided reason. The Sophists were thus like the rhetoricians in their willingness to play with proofs, even when these proofs yielded objective references that were absurd or manifestly incompatible with known facts.

Furthermore some expressions used by authors in the period following Parmenides suggest that the reason was regarded as a kind of tyrant, whose behests must be

¹⁴ cf. Blass, *Bered.*, p. 4: "Sophistik und Rhetorik sind nicht identisch, aber doch mehr dem Namen als der Sache nach getrannt . . ."; Croiset, *Abridged History* (English trans.), pp. 281, 282: "The art of speech, in its two principal forms of eristic and rhetoric, was one of the essential aims of sophistic instruction."

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obeyed, no matter what the consequences. Herodotus uses the phrases λόγος αἰρέει and ὁ λόγος ἔπεισε; and Plato says: "whithersoever the λόγος, like a wind, bears us, thither we must go."¹⁵ Speaking of Plato himself, Jowett remarks truly: "He belonged to an age in which men felt too strongly the first pleasure of metaphysical speculation to be able to estimate the true value of the ideas which they conceived."¹⁶ The cosmic Nous or Mind of Anaxagoras was conceived somewhat differently from Logos; but it was at bottom the faculty of thought, and it was described as autocratic and supreme, the epithets of divinity. All these conceptions of reason, as well as that of Parmenides, seem to suggest that reason had autocratic power to establish its conclusions. These early Greeks, who first employed the reason for rhetorical, sophistic, or philosophical purposes, did not have a logical apparatus at their disposal, by which they could assess the worth of their instrument; and in the absence of this critical understanding, they regarded an inferential proof as something peremptory and absolute.

If the expressions of later times suggest a deification of reason, it is small wonder that Parmenides regarded it as a goddess of truth. He was the first to employ pure reason in philosophy; it yielded strange conclusions utterly at variance with sense experience; it took him, as it were, to another realm, "far from the beaten track of men"; and yet these conclusions and this other realm seemed to have a kind of divine necessity about them, which gave them a transcendent validity. Reason or truth

¹⁵ Herod. I, 132; II, 33; III, 33; VI, 35. Plato, *Rep.*, III, 394 d 8; cf. *ἀνφαίη ὁ λόγος*, *Phaedo*, 87 a 8. In Plato the word takes on the connotation of argument, or reason working along a particular line within self-imposed limits.

¹⁶ *The Republic of Plato*, Index s.v. "Idea."

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thus tended to become a cosmic agent, and Parmenides speaks of a "force of truth" which will not allow anything to come into being from that which is not (8, line 12). It is then this divine force of truth which speaks in the poem of Parmenides, and if its statements seem improbable to mortals, these statements are, it must be remembered, the revelations of an agent beyond the reach of mortal senses. It would therefore appear that the apocalyptic form of the Introduction and the poem in general was due to the author's conception of reason as having some divine power; and we naturally do not understand the situation easily, because we think of reason as an impersonal machine.

8. Two questions now remain for our consideration; we must come to an understanding of The Way of Opinion, and of its relation to the Truth. The Way of Opinion professes to describe the opinions of mortals, and we have already seen that this latter phrase refers to the common explanation of the world, which involves the notion of change. Now The Way of Truth had shown that the world must be one substance; but if change is to be explained at all, that can be done only by the use of two things. In other words, the most "likely" interpretation cannot be made on the Heraclitean basis of one substance that alters, but must rest on a Pythagorean basis of two principles or "forms" of things that interact; and certainly if you are going to attempt to explain change, you will want the most likely account of it (8, line 60). It is thus quite natural that The Way of Opinion should contain certain essential features of the Pythagorean dualism. But since it was meant as the most likely interpretation of the phenomena of change, there was no reason why it should be limited to Pythagorean doctrines; and in fact, the

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fragments of it that remain read like the latest and best cosmological science, without reference to any particular school of thought.

It would appear that the attention of cosmologists was being drawn more and more toward terrestrial phenomena, a tendency that is unmistakable in Empedocles, but of which the forerunner is evident in the physiological theories of Parmenides and of Alcmeon. Aristotle and Theophrastus have preserved a fragment of Parmenides' physiology, in which he speaks, somewhat obscurely, of a "mixture" in the human body; and Theophrastus employs the same phrase in his elucidation of the passage.¹⁷ Moreover in the same fragment, Parmenides asserts that a person's thought depends upon "that of which there is more in him," which Theophrastus explains as the preponderance of the light or dark element in the body. These remarks would suggest that Parmenides believed the human body was composed of the two things, which he calls elsewhere the forms of light and night, or fire and darkness; and that the constitution of a body at any time was determined by the proportion in which these things or forms were mixed.

The idea of a variable proportion would seem to presuppose an oscillation of the two elements and thus to involve the old notion of a natural Justice, which makes up for encroachment by permitting an opposite one. In this connection, it is interesting to recall a phrase from the apocalyptic Introduction of the poem: "avenging Justice," who is described as keeper of the keys that fit the gates of the ways of night and day (1, lines 11-14). If we wonder why the divinity who controls night and day is called Justice, we can only surmise that this is the same

¹⁷ frag. 16; Arist., *Met.*, III, 5. 1009 b 21; Theo., *De Sensu*, 3.

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eternal law of compensation, to which Anaximander and Heraclitus had alluded. Moreover, the significance of the epithet "avenging" must be found in compensation for encroachment—an idea which recalls the Heraclitean notion of a Justice with avenging power through the Erinyes. These references would indicate that the original notion of a compensatory regularity was still in the mind of Parmenides.

On the other hand, Parmenides also uses the figure of Necessity, and he was probably the first thinker to employ this notion for cosmological purposes. Necessity was an Orphic personage, and may have come to the notice of Parmenides through Pythagorean sources. In *The Way of Opinion*, a divinity which must be identified with Necessity is said to direct the course of all things, to be the beginner of pairing and birth, and to have created Eros first of all the gods (12, 13). But the statement that is most significant is that Necessity took the heavens and bound them to keep the limits of the stars (10, lines 5-7). Remembering that this is cosmology from *The Way of Opinion*, we may compare with it two phrases from *The Way of Truth*. In the first, Parmenides says that strong Necessity keeps What-is in the bonds of a limit which restrains it on every side; in the second, that Fate has bound What-is so as to be whole and immovable.¹⁸ Thus the some inexorable force which, according to reason, cannot allow any change, is for cosmological science the law which makes for celestial regularity. These different rôles played by Necessity, as well as the use of both Justice and Necessity, suggest that Parmenides was guilty of the same confusion of thought, on the subject of natural regularity, as we found in Heraclitus. But the name Necessity and

¹⁸ frag. 8, ll. 30, 31; ll. 37, 38.

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several of the references to it in the poem spring from the conception of an absolute, invariable regularity, comparable to the preordained limits in the system of Heraclitus and the mathematical law of Pythagoras. And Parmenides' use of this concept represents a further step in the transition from the old Milesian notion of natural Justice and Injustice to the later idea of mechanical regularity, which predominates in the Atomist system.

Parmenides regarded the heavenly bodies as bands of fire, separated from one another by intermediate bands of dark air—a view which was ultimately Milesian but was probably also held by Pythagoras. Furthermore Parmenides knew that the moon shone by the reflected light of the sun; and though he was the first cosmologist to mention the fact, he probably did not discover it. Professor Burnet is no doubt correct in supposing that the discovery was made within the Pythagorean Order; and this was probably the source of Parmenides' information.

The Way of Opinion thus contains physiological theories on the composition of the human body, the mechanics of thinking, and the formation of embryos. It also embraces views of the origin and movement of the heavenly bodies, and these views rest on a dualistic conception of nature, as composed of fire and night. Finally there is the figure of Necessity, which seems to imply a new notion of natural regularity. The basic features and many details of this system appear to be Pythagorean; but certain other elements in it, such as the double idea of regularity and the psychological doctrine, are probably not derived from that source. On the whole, The Way of Opinion is best taken to represent a compendium of contemporary cosmology, the most likely scientific explanation of nature that Parmenides could make.

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9. We must now attempt to discover the real relation between this Way of Opinion and The Way of Truth. Several times in the course of the poem, the statement is made that there is no truth in the beliefs of mortals, which are described in The Way of Opinion; but the significance of this statement is lost if we do not remember that it is not Parmenides, but the goddess, who is speaking. The goddess uses the phrase "the opinions of mortals," and the goddess asserts that there is no truth in them, for truth is a divine possession. The superficial meaning of these words is not hard to guess; there is indeed no truth in The Way of Opinion because, as we have previously seen, truth is reasoned proof, and the explanations of phenomena offered by cosmology and resting on the idea of motion in empty space cannot be "proved" in this sense. And these explanations are called the opinion of mortals, in contradistinction to the goddess' own truth, because they involve the notion of separate, changing things, which are given in the general experience of mortal men.

But to accept these statements at their face value would be possible only if we entirely overlooked the question why Parmenides considered it worth while to describe the opinions of men, which were utterly false. To that question we demand an answer before we can be satisfied that the author means what he says. Now the only direct information on this point in the poem is the statement of the goddess that there are only two ways of investigation, and that she will tell Parmenides the true way because it is right for him to know the truth, and the false way in order that no other human mind shall ever outdo him. This remark does not afford much help, except that it agrees with several others in indicating that Parmenides knew there were two possible ways of investigating the world, al-

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though only one was right. But what makes the wrong way a way at all? or how do the various opinions of men come to be a single method of interpreting the world? It is, we find, because these opinions can be formed into an orderly arrangement or system (διάκοσμον, 8, line 60), which may seem likely or plausible. This system is made up of appearances (τὰ δοκοῦντα), and to gain the truth, we must pass through each of these appearances and judge them all together (1, lines 31, 32). When we do that, we find that they are only "names," which men have invented for their convenience, but which have no corresponding reality (19, line 3); for when we raise the question of existence or reality, we see that none of these named things has any existence of its own and the whole system of names collapses into the undifferentiated unity of What-is. Thus although there is no truth in these opinions of men, there is some use in knowing them, because we have to pass through this system on the way to the truth and the parts of this system of appearances must be rightly judged (1, lines 28-30).

It should be noticed that there is a sharp opposition between Truth and Opinion, which the author takes pains to make prominent. This opposition in itself is enough to show that Parmenides had thought deeply on logical matters; and when we put it in conjunction with his views on the subject of names and their objective reference, it is evident that he was capable of dealing with very abstract considerations. But even that is not all; for we have also found that he uses the expressions What-is (τὸ εἶν), What-is-not (τὸ μὴ εἶν), and What-seems-to-be (τὰ δοκοῦντα), and that he identifies What-seems-to-be with What-is-not. Furthermore he connects reason (λόγος) with What-is; and he seems to refer eyes, ears, and tongue (*sc.* taste)

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to opinion—a reference which is all the more natural in Greek on account of the confusion of perception and opinion in the verbs *δοκῶ* and *εἵκειν*, both of which Parmenides uses. There is, however, no question of two worlds, one sensible, the other intelligible; for the real world of reason is still the sensible, corporeal world. There are not two worlds, but rather two “Ways” of interpreting one and the same world. Thus Parmenides, after recognizing that appearances form a system which can appeal to the mind, could not establish any relation between this system and reality; and he ended by interpreting the appearances as equivalent to What-is-not, and their system as a falsehood.

CHAPTER VI

EMPEDOCLES

1. EMPEDOCLES was a native of Acragas, a city on the southern shore of Sicily, and he belonged therefore, like Parmenides, to western Hellas. His date is very uncertain, but he must have died after 444 B.C. ; and for philosophical purposes the important chronological point is that his philosophy appears to come after that of Parmenides and to have been framed in conscious reference to it. According to good authority, Empedocles was a student of Parmenides, and it was no doubt his master's example which influenced him to express his thoughts in verse. Considerable fragments of two poems have been preserved; the one poem, entitled *On Nature*, contains philosophical and scientific matter, while the other, called *Purifications*, is mainly religious and mystical. This interest in both science and mysticism is reminiscent of Pythagoras; but Empedocles' interest was by no means confined to these two fields, for he was prominent also in the politics of his native city, and in the development of rhetoric and of medicine. Therein lay part of his value to philosophy, for he widened its scope by the introduction of new material.

2. Empedocles was recognized as one of the founders of the Italian school of medicine, and it was no doubt his work in medicine that gave him his scientific attitude toward the details of nature. Before him philosophers had considered mainly the grand processes and the grosser

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parts of the world, such as combustion and the heavenly bodies; but Empedocles investigated also the minor and seemingly unimportant things. Moreover, as a general rule, he tried to justify his theories by pointing to facts, to a far greater extent than any of his predecessors had done; and scattered through his work there are such phrases as "come now, look at things that bear witness to my previous discourse . . . see the sun . . . and the rain" (21), or "This you can see in shell-fish . . . sea-snails . . . turtles" (76). He thus depended on the evidence of his senses, and where Parmenides thought of proof as logical demonstration, Empedocles thought of it as sense experience. That this method had been consciously adopted and its contrast with that of Parmenides appreciated seems to be indicated by some verses at the beginning of the poem *On Nature*, where the Muse (represented as the author of the poem) condemns investigators who boastfully profess to discover the whole, and instructs the writer to consider with all his human faculties in what way each thing is clear (2, 4). Of course, Empedocles understood the thinking capacity, and he meant neither to neglect it nor to give up the attempt to discover the meaning of nature as a whole; his point is rather that the senses should not be discarded, and that is what Parmenides had done. The method of Empedocles was thus scientific in depending upon detailed investigation and appealing to sense experience.

3. It is obvious that such an attitude toward experience would carry with it acceptance of the fact of change, and it was at this point that Empedocles found his specific problem. Heraclitus had carried the notion of change to a point where substance became impossible, while Parmenides had carried the notion of substance to a point

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where change became impossible; but taken together, their philosophies might suggest that substance and change could both be kept if they could be made independent of each other, and it was along this line of thought that Empedocles sought his solution.

4. With reference to substance, Empedocles accepted the contention of Parmenides that substance is uncreated and imperishable, and that there is no empty space (11-14). On the other hand, he did not follow his master in holding that substance was unitary; there were, he believed, four basic substances which entered into the composition of the world: earth, air, fire, and water. Each of these substances was represented as always "alike," that is, it did not admit of qualitative change; and they were also "equal," that is, they were quantitatively equivalent to one another. Empedocles called them "roots" of all things (6), an expression which reminds us of the Pythagorean oath (above, p. 41), and which suggests that they were conceived as the ultimate simple elements of which all things are composed. Inasmuch as they were distinct varieties of matter, which could not be separated into different forms, they were true elements, and the first to be adequately conceived as such in Greek philosophy.

Empedocles does not say why he selected fire, air, water, and earth as the ultimate substances of the world; but the School of medicine which he helped to found identified these substances with "opposites," hot, cold, moist, and dry, respectively, and probably Empedocles himself believed that the various qualities which we experience in things could be analyzed into these four ultimate qualities. On the other hand, he also localized the

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elements in particular bodies, viz. the sun, the sky,¹ the sea, and the earth (22), and in effect he thus identified a particular ultimate quality with the material of a particular simple body. This conception shows that he had not advanced to the point of forming a distinct notion of quality at all—that was the work of Socrates and Plato.

Since the elements of things were at the same time actually existent in their pure form, there were, according to Empedocles, two kinds of things: pure elements or simple substances, and mixed derivatives. To the latter class belonged every thing that was not a pure element, and specifically all mortal combinations, such as plants and animals. A human body, for instance, was a definite composite of earth, air, fire, and water. But such things have no substance of their own—they come into being and pass away, and they can be analyzed into their simple components which do not come into being or pass away. We can name these compounds, just as we name the elements; but we must not suppose that the name of a compound implies a particular substance, as it does in the case of an element (8).

5. A compound is a temporary combination of different substances in a particular form; and since the substances of which it is composed are indestructible, coming into being and passing away and all the phenomena of growth must be considered merely as changes of form.² Furthermore since Empedocles held that there was no empty space, a change of form had to be explained as a rearrangement of substances, so that when one substance

¹ Empedocles had discovered the corporeal nature of air, cf. frag. 100; and it could no longer be thought of as a void between the parts of the world.

² *eîdos* and *îdêa*, 22, 7; 35, 17; 71, 3; 115, 7; 125. These are the words used by Plato for Forms or Ideas.

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left a place, that place was immediately filled by another substance. Change was in fact the mixture and separation of four indestructible elements; and by this theory Empedocles was enabled to maintain the reality of change, and yet keep the Parmenidean notion of substance.

In regard to the mechanics of mixture and separation, the fragments are unsatisfactory. In one of them (23), mixture is explained by the metaphor of a painter harmoniously combining pigments of different colors in various amounts; and mixture is thus a blend (*κρᾶσιν*, 22, 4), although all the scattered parts of an element are said to be closely joined together, and *ex hypothesi* all parts must keep the characteristic quality. In another fragment (26), the elements are said to "disappear into one another" and to "run through one another,"³ and Aristotle tells us that Empedocles explained mixture in general by "the symmetry of pores." This idea of pores was no doubt an analogy from the living body, for the author in the course of his physiological work had adopted the view that "the outer surface of the skin is perforated clear through with closely packed pores" (100; cf. 84). Whether Empedocles himself assumed pores for the elements or only for compounds we do not know. Aristotle points out the significance of this concept of pores; for, when taken in conjunction with the doctrine of mixture and separation, it suggests atomism, and yet if the pores are empty, there must be a void, and if full, they are useless. But such points were beyond the range of Empedocles' thought, and we must not try to elaborate his statement that the elements somehow run through one another.

6. Empedocles now had to explain what made the ele-

³ frag. 26; cf. frag. 17, 34. Arist., *De Gen. et Corr.*, I, 8. 324 b 34.

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ments act in this way. Since they were substances in the full Parmenidean sense, it was assumed that they had no power in themselves of mixing; and once a combination was formed, there was no power in it to separate the elements and bring about dissolution. Mixture and separation therefore had to be accounted for by things other than the elements which were mixed and separated. Here again Empedocles was influenced by his biological interests, and he posited two things which he called Love and Strife, cosmological fluids, as it were, whose function was to unite and dissolve. He specifically says that the cosmic Love is the same thing that is known as being implanted in the frames of mortals and that makes them think loving thoughts and do friendly deeds (17, lines 19, 20; cf. frag. 20). In other words, Love unites different elements to form a mortal combination, and Strife disintegrates such a combination so that the elements are separated from one another. Love is therefore not the attraction of like for like, but an outside force that brings unlike things together.

The part which the four elements played in Empedocles' system was that *out of* which mortal things were made, while Love and Strife were that *by* which mortal things were made. The distinction was undoubtedly the result of the separation of change and substance suggested by Heraclitus and Parmenides; and it shows that the author was working in the direction of a concept of force. He did not reach this concept for two reasons. In the first place, his thought was limited to the category of the corporeal, and he therefore had to describe Love and Strife in the same corporeal terms which he used for the elements. Strife was thus "equal in weight," and Love "equal in length and breadth," to the elements. From this point

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of view there appear to be six bodies.⁴ In the second place, the elements themselves appear to be endowed with certain active capacities. Thus the elements are said to come together "voluntarily," and a part of an element is represented as "desirous of returning to its like."⁵ From this point of view there appear to be six forces. Empedocles could no more conceive of a totally inactive thing than he could of a totally incorporeal thing. And yet it would be a mistake not to realize that there was a distinction between the four elements on the one hand, and Love and Strife on the other, and that the invention of Love and Strife as cosmic figures marked an advance in philosophy. The only reason for having Love and Strife at all was to account for mixture and separation, that is, to cause change; and their corporeality was entirely secondary, and necessary only to explain their existence. They thus appeared like a different *kind* of thing from the ordinary objects of sensible experience, a kind of thing, as Empedocles suggests, that must be seen with the mind rather than with the eyes (frag. 17, lines 21, 25).

7. Since Love and Strife were both active, there had to be some law which governed their interrelation; but on this subject the author is obscure, except for the point that they alternately predominated. Apparently he conceived of the ultimate operation of the world in both a mechanical and a mystical fashion. Mechanically the world was a vortex or whirl (35, 4), and in form it was a sphere (as Parmenides had argued). But connected in some fashion with the sphere there was a circle, which went round; and the sphere itself is described as circular. We cannot hope to weave these details into a fabric of

⁴ cf. Arist., *Met.* I, 10. 1075 b 3; Theo., *Phys. Opin.*, frag. 3 (*Dox.*, p. 477).

⁵ *θέλῃμα*, 35, 6; *θέλον*, 62, 6; *ποθέοντα*, 110, 9.

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consistent theory, but it looks as if the author had confused vortical movement in a plane (like an eddy of water) with the rotary movement of a sphere, in which case the circle might have been a kind of celestial equator. Be that as it may, each of the four elements had its place in the circle and predominated as the circle came round, although the author does not say what the predominance of an element meant. Also as the alternate time comes round, Love and Strife displace each other in the world, the one entering as the other leaves. The alternate time is in turn fixed by a "broad oath," and here we are frankly in the realm of mysticism. It is of course possible that Empedocles thought of this broad oath in material terms and identified it with the boundary between Love and Strife or some other cosmic arrangement; but there is no indication of such a meaning in the fragments, and in the *Purifications* broad oaths are connected with Necessity. This is the same half-cosmological, half-mystical figure that we found in the poem of Empedocles' master, Parmenides (above, p. 77); and it represents the notion of ultimate cosmic regularity. In the final analysis, therefore, Necessity regulates the alternation of Love and Strife in effecting the mixture and separation of the four elements by the mechanism of a vortical motion.⁶

The alternation of Love and Strife produced by the

⁶ The above interpretation is based on the following references: "as the time comes round" and "in turn," 17, 29; "as the circle comes round," 26, 1; "the circle" and "circular sphere," 26, 12; 27, 4; 28, 2; 35, 10; "the broad oath," 30, 2; "Necessity," 115 and 116. Empedocles also assumed Chance in his cosmology; cf. *συνέκυψε*, 53 and 59, *τύχης*, 103. There need be no difficulty about the former, for it does not specify a distinct cause called chance, but only avoids specifying any cause. What *τύχη* is Empedocles does not say, but it may be the same as Necessity. Aristotle's criticism of Empedocles for attributing too much to chance (*Phys.*, II, 8, 198 b 29) does not imply that Empedocles actually assumed a distinct chance, but only that he did not take account of final causes.

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vortex a kind of cosmic evolution, only the main features of which we need notice. (1) The world started as a sphere with Love diffused and Strife on the outside and the elements perfectly mixed. (2) As Strife entered, the different portions of each element began to come together out of the mixture, first air, then fire, earth, and water, in that order.⁷ (3) This process was completed with the full preponderance of Strife, all of each element united, and Love expelled. (4) Finally, there was the reverse process when Love began to enter the world and Strife to pass out, until the original condition was reached. The present condition of the world would be possible only in the second and fourth periods, and Professor Burnet has shown that it was probably in the second.⁸ Coincident with this cosmic evolution, there was also an evolution of living forms, which was double in that it occurred both in the second and the fourth periods. In the fourth period, the parts of animals were produced separately—heads without necks, arms without shoulders (57), and so forth; and then these separate limbs were united in all sorts of combinations, only the fittest of which survived (59-61). In the second period, the earth sent forth portions of itself mixed with water and fire, and having only the general outlines of animal forms; these were afterward differentiated into various limbs, sexes, and species (62). While Empedocles certainly had the notion of an evolution of organisms and even of the survival of the fittest, it is clear that he had no proper idea of the part played in this process by reproduction and heredity, or the development of species. And in the end the whole process was mechanically governed by Love and Strife.

⁷ cf. Aetius II, 6, 3 *Dox.*, p. 334; and Ps.-Plut., *Strom.*, frag. 10 *Dox.*, p. 582.

⁸ Burnet, pp. 234 ff. Zeller, pp. 785 ff., held to the fourth period.

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8. Empedocles spoke of Love as divine (86) and of the sphere as god (31). Now the form of his expression (27) suggests that he thought of the sphere as produced by Love alone, and that is the interpretation of Simplicius, who probably represents Theophrastus, who must have had the poem of Empedocles before him.⁹ In other words, the sphere is the result of Love's binding together the four elements; and it was thus easy for the author to think of Love and the sphere as the same thing. Furthermore there are two fragments, one from the poem *On Nature*, the other from the religious poem called *Purifications*, in both of which the author attacks anthropomorphism, as follows:

Two branches do not sprout from a back, there are no feet, no swift knees, no genital parts; but it is a sphere and equal to itself on every side. (frag. 29)

There is no body furnished with human head, two branches do not sprout from a back, there are no feet, no swift knees, no hairy parts; but there is only a sacred and ineffable mind flashing through all the world with swift thoughts. (frag. 134)

It is obvious that the first parts of both fragments refer to the same thing, and it is natural to suppose that the second parts do the same. In that case the sphere (Love) would be also cosmic mind. This identification is made more intelligible, when we find that Empedocles connected human thought with even mixture of the elements in the region of the heart, for the sphere is simply the condition of the world where the elements are completely mixed by Love. Moreover, Empedocles represents himself as suffering punishment because he had put his trust in raging Strife (115), and other passages indicate that

⁹ Simp., *Phys.*, 1124, 1; cf. *De Coelo*, 293, 18 *DFV*, p. 161, 52, and Philop., *De Gen. et Corr.*, 19, 3 Vitelli *DFV*, p. 160, 41.

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his sin lay in eating flesh—the killing of animals puts into operation the law of Strife. Contrasted with this condition of Strife, there is Love, who makes men “think loving thoughts and do friendly deeds” (17). It is then not difficult to connect Love with good, and Strife with evil, and to appreciate the propriety of worshipping Love. Love then is god, the cosmological force which streams through the elements and binds them together into the sphere, the cosmic intelligence which penetrates the whole world with its thoughts, and the deity to whom mortals owe their existence and whom they ought to worship.

9. On human life and activity also Empedocles had both scientific and mystical doctrines. He believed that perception resulted from objects fitting into the pores of the sense organs, and that it took place when an element in the organ met the same element in the object. He made no real distinction between perception and thought; the latter was a kind of finer sensibility and was localized chiefly in the blood around the heart, where the elements were most evenly mixed. But he believed that other parts of the body and indeed all things were endowed with thought, an easy corollary of the doctrine that thought is Love, which is present in all mortal combinations. Since thought, like perception, was the meeting of likes, Empedocles apparently drew the conclusion that it was possible to have any good thing by thinking about it sufficiently, for it would then “grow into the heart.” It was accordingly within the power of a thoughtful man to have all happiness, to learn drugs that ward off evil and old age, to govern the winds, and to bring back the dead (110, 111). Moreover, Empedocles represents himself as a fallen god, according to the doctrine of transmigration. If a demon or divinity pollutes his hands with blood or

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forswears himself, he is forced out of his abode with the blessed for thirty thousand seasons and is tossed from one element to another (115). On the other hand, those who lead the life of wisdom reappear as prophets, poets, physicians, and princes, and thereafter become gods (146). What the special cosmological composition of these gods is Empedocles did not say; but that his cosmology made room for gods is proved by a reference in the poem *On Nature* (21), where they are said to be formed from the elements, like all other things. The foregoing doctrines leave no room for doubt that Empedocles, from both the scientific and the religious standpoints, put a high value on wisdom; it was an attribute of god (enough to make it a human ideal), and it brought great practical benefits to a human possessor. Hence "happy is he who has gained the wealth of divine wisdom; wretched is he who has a dim opinion of gods" (132). That is the ethics of Empedocles in a nutshell.

10. The philosophy of Empedocles cannot be simply characterized, because it was many-sided. That it had a truly scientific aspect we noted at the beginning; but we have also seen a strong religious and mystical strain in it. A member of the Coan medical school, founded by Hippocrates shortly after Empedocles' death, protested against the magical and unscientific practices of the School of Empedocles;¹⁰ and we must admit the justice of this criticism, while at the same time maintaining the scientific quality of Empedocles' use of observation in philosophy. Some modern historians of philosophy have felt it impossible to reconcile the religious and the scientific doctrines, and have accordingly adopted the view that there was a gulf between them in the mind of the author,

¹⁰ Hippocrates *περὶ ἱερῆς νόσου*, 1.

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the one being described in the poem *On Nature*, the other in the *Purifications*. But such a view is not borne out by a careful interpretation of the language of the poems. In the conception of the final regularity of the world, of divinity, and of human life, there is both a cosmological (scientific) and a religious (mystical) side; but the two sides are presented within the compass of the one poem *On Nature*. The truth would seem to be that Empedocles made no conscious distinction between religion and science—they are modern categories—and he passed insensibly from what we call a scientific to what we call a mystical interpretation. There is no greater inconsistency between his science and his religion, than there is between different parts of his science; and we must remember that inconsistency is judged on the basis of our present knowledge.

CHAPTER VII

ANAXAGORAS

1. ANAXAGORAS was a native of Clazomenae in Asia Minor, and his thought plainly shows the impress of the Ionian tradition and especially the influence of Anaximenes. But he left his home and came to Athens, where he is said to have remained for thirty years. This would be in the middle of the fifth century, before the Peloponnesian War, but the dates cannot be established with any certainty. He was the first philosopher to take up his residence in Athens, which was then making itself, under the leadership of Pericles, the most prominent city in Greece; and the statesman became a pupil of the philosopher, though without doubt it was not the cosmology but the practical application of Anaxagoras' doctrine of Mind to politics and rhetoric that interested Pericles. Euripides also appears to have been influenced by Anaxagoras, though what their personal relations were is not known. A charge of impiety or irreligion was lodged against Anaxagoras, which means that some of his doctrines had offended supporters of the accepted religion; but Pericles in some way got him released, and he went to Lampsacus, where he founded a school. He developed his philosophical theory in a prose treatise, considerable fragments of which have been preserved.

2. The general problem of Anaxagoras was much the same as that of Empedocles, viz. to reconcile the Parmeni-

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dean conclusion that substance is an unchangeable continuum with the plain evidence of a changing manifold, presented by the senses and insisted upon by Heraclitus. And from the most abstract point of view, he approached the problem by the same way that Empedocles had taken: (1) denying the possibility of coming into being and passing away, but positing mixture and separation (change); (2) assuming a distinct agent of mixture and separation (cause of change). On the other hand, he was an original thinker of no mean attainments, and his originality appears in (1) his doctrine of infinite divisibility; and (2) his conception of the cause of change as Mind.

3. Empedocles had suggested that if you analyzed things, you would come in the end to four ultimate things which were qualitatively simple and separate from one another—in other words, the process of analysis cannot go on forever, but must stop when it reaches an ultimate element. But Anaxagoras might have pointed out that an element as a whole is, by Empedocles' own theory, split up into parts (frag. 22, 1), which appear in different mortal combinations; and if the whole is thus divisible, there is no reason why a part should not be divisible. Empedocles had uncritically connected quantitative division with qualitative complexity, and assumed that, while by division you could arrive at the simple, yet the simple put a stop to further division. Anaxagoras on the contrary held that there was no natural limit to division—you can divide anything infinitely. "There is no least of what is small, but there is always a smaller; for it is impossible that what is should cease to be by being cut."¹ The utmost that can be said, therefore, is that you can take anything

¹frag. 3, *DFV*, p. 314, reading $\tau\omicron\mu\tilde{\eta}$ with Zeller and Burnet for Diels' $\tau\omicron\delta\mu\tilde{\eta}$.

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you please, divide it up into as small portions as you please, and regard these portions as the "seeds" or elemental components of the thing. The seeds will be infinite in number and smallness, for they are theoretical, not natural entities, and can be defined only by the point at which you choose to stop in the process of division, which may be infinite. The world is thus a continuum, as Parmenides had held; and a continuum cannot be put together out of discrete elements,² as Empedocles had tried to do. Anaxagoras accordingly says "the things that are in one world are not separated or cut off from one another with a hatchet" (frag. 8); and that must mean that there are no natural elements of the world or that there are theoretically an infinite number of them.

4. It would follow from the foregoing that there are no simple components of things; but Anaxagoras reinforced the point by arguing that it would be impossible for a complex thing of certain qualities to be compounded out of simple things with other qualities. He is reported to have asked how hair could come from what is not hair, or flesh from what is not flesh (frag. 10), meaning that you could divide hair *ad infinitum* and the resultant portions would still be hair. This view might suggest that every species of thing had a separate and distinct substance; but such a conclusion would be inconsistent with the postulate of continuity and would also fail to account for the phenomena of growth, for the food we eat and the water we drink somehow become flesh and hair. Hence Anaxagoras adopted the theory that there is "a portion of everything in everything" (frag. 11), that is, everything contains all possible qualities.

² cf. H. Weyl, "Die heutige Erkenntnislage in der Mathematik" (Von Anaxagoras bis Dedekind), *Symposion* I, 1.

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5. How then are we able to distinguish one thing from another, or account for the apparent qualitative differences between things? To this question Anaxagoras proposed two answers, one cosmological, and one psychological. The general features of his cosmology are as follows. The world started with "all things together" (frag. 1), an infinite, undifferentiated mass, like the perfectly mixed sphere of Empedocles. But a revolution or rotatory movement started in a part of this mass and increased in area; and the effect of this motion was to separate out opposite qualities—the rare from the dense, the warm from the cold, the light from the dark, the dry from the moist (frag. 12). "The dense and the moist and the cold and the dark came together where the earth is now, while the rare and the warm and the dry went out to the edge of the ether" (frag. 15), so that the world presented the appearance of air (dense, moist, cold, dark) and of ether or fire (rare, dry, warm, light). As the revolution extended, it produced mixture and separation of the fundamental opposites, which eventually resulted in the present appearance of the world, and which is now called change. But this account must be interpreted in the light of the general doctrine of continuity, and when the author says that the opposites were separated off, he does not mean absolutely separated, for he distinctly says in another place that "nothing is absolutely separated or distinguished from anything else" (frag. 12, line 8; cf. frags. 6 and 8). Even the fundamental opposites contain portions of their opposites, so that the dense, for example, is only mostly dense, for it is also partly rare. Hence each thing has all the qualities, but more of some than of others; and it may be distinguished by those qualities of which it has most.

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The psychological counterpart of this physical doctrine is the theory that "from the weakness of our senses we are not able to judge the truth" (frag. 21). The truth is obviously that each thing contains portions of all the qualities; but our senses discern only the predominant ones, of which there is most. Thus snow, for instance, has black in it; but there is more white than black, and we perceive only the white. Qualitative difference is therefore partly a cosmological fact resulting from the separation of opposites, and partly a psychological illusion of the senses, which has to be corrected by the mind.

6. It seems clear that in these doctrines Anaxagoras had got hold of two ideas, things and seeds, which were destined to prove of extraordinary fertility but which resisted his own powers of analysis. (1) When he says that "in everything there is a portion of everything," the second "everything" means, as he indicates in other passages, the hot and the cold and the other traditional opposites, i.e. what we call qualities. Now he held that while the ordinary objective things of sense experience resulted from a cosmological process of separation and mixture, and were therefore ephemeral, the "opposite" things, such as hot and cold, were original attributes of the world and were eternal—all that happened to them was to be mixed and separated, and obviously they had to exist before this could be done to them. Anaxagoras thus suggested that there were two different kinds of thing (physical objects and qualities), but they both remained things in his thought. And this way of speaking gave rise to a difficulty in his system; for if the opposites were physical things, they must be separate from one another and then the world was made up of discrete parts, and if they were not physical things, how could they be separated and mixed?

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What Anaxagoras really did was to indicate that the old category of "thing" needed to be revised and supplemented by a new category of quality, and he made this need more manifest by talking about things in this abstract way for the first time.³ The erection of a new category of quality (ποιότης) and the assumption of qualities as ultimate characters of the world was made by Socrates and Plato. (2) Anaxagoras' hesitation on the subject of things is matched by his difficulty with the notion of seeds. It is hard to see how some of the world could have "more" of hot than of cold in it, unless it were composed of elements which originally had that character. In other words, the first separating off implies natural elements; and in this train of thought, the author speaks as if the seeds had different qualities and formed the substance for mixing and separating (frag. 4, lines 2 and 17). Yet when he says, "since it is impossible that there should be a least thing, it could not be separated nor could it come into existence by itself" (frag. 6, lines 3-5), he leaves no room for any infinitesimal elements. What, then, were the seeds, and how were they related to the qualities? The distinction of theoretical divisibility from natural divisions, and the assumption of natural atoms which had different qualities, was made by Leucippus and Democritus. Thus in these two concepts of things and of seeds Anaxagoras found material which later became of high value to philosophy, but which he himself was unable to manipulate successfully.

7. Since Anaxagoras accepted the Parmenidean conclusion that corporeal substance cannot move itself, he required an outside agent to produce change; and for this

³ The Greek word *χρῆμα*, which he employed, ordinarily meant property or wealth.

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purpose he posited a cosmic Nous or Mind. This is described as infinite, unmixed, all alike, the thinnest and purest of all things (frag. 12), and these epithets certainly suggest a corporeal nature. On the other hand, Nous is absolutely distinct from everything else—the only “thing” that is altogether separate and outside the area of infinite divisibility; and its essence is obviously not in these static qualities but rather in its power. It has power over itself and over the revolution, which it started, in fact, over all things. Hence, while it is true that Anaxagoras did not posit an incorporeal Mind, it is also true and much more significant that he did assume a source of power, which was entirely different from all else in the world, and which alone was god. The Love and Strife of Empedocles were like “streams” or fluids which penetrated the mixture of corporeal elements, and it was only when they were “in” the mixture that they governed it. But the Nous of Anaxagoras was “alone by itself,” and the author is careful to state that if it were mixed with other things, these latter would hinder the exercise of its power. Thus he definitely joins the attribute of power with the characteristic of being apart from things, and such a combination is certainly very close to the concept of incorporeal cause of motion.

Since things, in the full sense of physical objects, have no power, the motion that appears in them is wholly derived from Nous; and that means that in the beginning Nous imparted motion to the world. Anaxagoras does not say that the physical world was created by Nous—he accepted the Parmenidean doctrine that nothing could be created—and his system therefore starts with the world-mixture and Nous, just as Aristotle started with matter and god. The activity of Nous embraced three

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aspects: (1) it started the rotatory movement; (2) it arranged what was to be; and (3) it knows all things.

(1) It was the rotatory movement that produced the separation of the opposites out of the original mixture and from one another and thus made possible further mixture and separation. It is to be noted that all change is to be explained as the result of the original revolution and that *Nous* does not interfere with the course of this revolution, once it has been started. It would be possible to cut off *Nous* from the apex of the system and have left a purely mechanistic explanation of the world.

(2) Besides starting the revolution, *Nous* arranged or "set in order all things that were to be, and that were but are not now, and that are" (frag. 12); that is, *Nous* designed or foreordained the subsequent mechanical arrangements of things in the world. The inference is that the revolution itself was an arrangement designed and actually initiated by *Nous* in order to carry out other arrangements. This suggestion of purposive activity on the part of the principle was new in Greek philosophy, and with it we must put the absence of Necessity and Chance, which had been introduced by the "Westerners," Parmenides and Empedocles. In the philosophy of Anaxagoras, the world appears as a series of mechanical operations designed and actuated by a free and intelligent cause; and this ancient Greek thinker is thus the prototype of those who believe that nature is regular and mechanical as the result of God's will.

(3) Finally, *Nous* has knowledge of everything. There is probably a suggestion that knowledge is discrimination—when you know a thing, you differentiate it from other things, and *Nous* separated things both physically and cognitively. But in any case, to the Greeks mind meant

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intelligent self-direction, involving both knowledge and power; and since the days of Xenophanes the material principles that had been assumed by successive thinkers had been endowed with both attributes. The originality of Anaxagoras lay in his conception of the principle as separate from the things over which it had power, and as uniting purposive with physical causation.

Plato and Aristotle criticized Anaxagoras for the place he assigned to his cosmic Mind. According to the former, Anaxagoras "made no use of Mind at all; he ascribed no causal power whatever in the ordering of things to it, but to airs, and ethers, and waters, and a multitude of other strange things." Aristotle, who undoubtedly knew Plato's criticism, says: "Anaxagoras uses Mind as a *deus ex machina*, and whenever he is unable to explain why anything necessarily is, he drags it in; otherwise he makes anything but Mind the cause."⁴ These two judgments of Anaxagoras, by Plato and Aristotle, are mutually contradictory, for the former complains that Mind had no causal power whatever in ordering things, while the latter says that it was used as the cause of everything which could not be explained naturally. Furthermore Plato's statement that Nous was not used at all is plainly wrong in view of the express assertion of Anaxagoras that Nous caused the original revolution, from which came all mundane change. Plato admits this in another place (*Crat.*, 413 c), and it is manifest that his criticism of Nous was really founded, not on the fact that it was not used at all (which is what he says), but on the ground that it was not used as the final cause or purpose of individual objects; that, however, was precisely what Anaxagoras did not mean to do, ex-

⁴ Plato, *Phaedo*, 97 b 8-98 c 2; Aristotle, *Met.* I, 4. 985 a 18, 983 b 15; cf. *De An.*, I, 2. 405 a 15.

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cept in so far as the original plan of *Nous* determined the whole world. Finally, Aristotle's words plainly imply that Anaxagoras used *Nous* sometimes as the cause of particular phenomena of nature; and that view, aside from running counter to Plato's interpretation, is opposed to the whole tenor of the Anaxagorean system. We are thus forced to the conclusion that Plato and Aristotle really misinterpreted the system of Anaxagoras.

8. Although *Nous* or Mind is altogether separate from everything else, yet it is said to be "in" some things (frag. 11); and it is not hard to guess that the author meant living forms. Empedocles had held that thought depended upon the even mixture of the elements and that all things had it (frag. 103). But Anaxagoras believed that thought was entirely distinct from the mixture of things, and his doctrine was significant in that it established the first distinction between the animate and the inanimate. Taken in conjunction with his cosmology, in which Mind was the intelligent first cause and the world moved mechanically, this distinction between animate and inanimate paved the way for adequate concepts of nature, as a system of non-intelligent moving phenomena, and of the soul or mind, as a non-phenomenal intelligent agent. This distinction between nature and mind, which Anaxagoras only suggested, was not consciously made in presocratic philosophy; and as it is involved in all our modern paraphernalia of ontological adjectives, such as materialistic, idealistic, dualistic, it is misleading to use these terms of early Greek thinkers.

Anaxagoras held that all *Nous* was the same, "both the greater (cosmic) and the smaller (human)"; but he does not say how *Nous* can be split up, so that parts of it can be in different bodies, nor what the relation of these

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parts is to the whole. He believed that plants and animals, as well as human beings, had *Nous*, and that the apparently various grades of intelligence were due to differences in bodily structure, some of which facilitated, while others hindered, the activity of *Nous*;⁵ but he does not explain how mind can move body. He also adopted the view that perception is a bodily process, and is produced by opposites, so that all sensation implies pain;⁶ and while this description is enough to distinguish perception from thought, no relation between the two processes is established.

9. The extant fragments of Anaxagoras contain no ethical or practical doctrines, but the tradition of the next century makes it plain that his teaching must have contained such doctrines. Plato says that the discourses of Anaxagoras mainly concerned the nature of intelligence and the absence of intelligence, and that from these discourses Pericles got information which he could use in the art of argumentation.⁷ The picture of Anaxagoras conversing about intelligence and the absence of intelligence accords perfectly with the views given above; but it goes further in its implication that his doctrine of intelligence contained a possible practical reference. What this was we are not told; but it at least gives a basis of plausibility to the stories which represent Anaxagoras as giving supreme value to the life of the intellect.⁸ According to

⁵ Arist., *De Part. An.*, IV, 10. 687 a 7.

⁶ Theo., *De Sensu*, 27 ff. *DFV*, p. 310.

⁷ *Phaedrus*, 270 a. Burnet's reading *diavolas* for *avolas*, misses the point that Anaxagoras differentiated between those things that had *Nous* and those that did not. Jowett translates: "the knowledge of Mind and the negative of Mind."

⁸ Aristotle, *Eth. Nic.*, VI, 7. 1141 b 3; X, 9. 1179 a 13; *Eth. Eud.* I, 4. 1216 a 11; Clem., *Strom.*, II, 130. cf. Euripides, frag. 910. All quoted *DFV*, p. 299.

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these reports, he held that the end of life was not wealth or power, but understanding of the world and the order that runs through it.

CHAPTER VIII

NEW TENDENCIES

1. WHILE Empedocles and Anaxagoras were still alive and propounding their cosmological theories, important changes were proceeding to modify the traditional course of Greek reflective thought. There was nothing sudden about the introduction of these new elements and many of them were really old implications that gradually gained preponderant emphasis, when the established tendencies had exhausted themselves. There was, however, a significant shifting of the scene. Heretofore the mainland of Greece had not concerned itself to any appreciable extent with philosophical speculation, which had been confined to Ionia and western Hellas; but about the middle of the fifth century, Athens rose to a preeminent position in the Greek world, and from that date she acted as its intellectual capital until the Roman Emperor Justinian disestablished the Academy in A.D. 529. By this change philosophy became to a large degree localized, so that it was no longer the play of a bold and inquisitive Ionian spirit on the equally bold but more emotional Western temperament, nor could the circumstances of one city offer a corrective reaction to meditations grounded in other surroundings. It was now bound up with the conditions of a particular place, and how profound an influence these conditions exercised on it can be seen by comparing the typical thought of the Sophistic, the Pla-

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tonic, and the later eclectic, ages with their respective historical backgrounds.¹

2. Certainly the new home did not furnish a soil that was naturally hospitable to philosophy. The Athenian commons of the fifth century were a sturdy, hard-handed and often bigoted lot, in many respects like the Romans of late Republican times; and we are prone to attribute to them too many spiritual graces that either were the ideals held up to them by their more enlightened leaders or were the typical boasts of popular oratory.² They appreciated the personal satire of an Aristophanes or the mythological scenes of a Sophocles; but they did not like the philosophers.³ Anaxagoras, Diagoras, Diogenes of Apollonia, and Socrates experienced the displeasure of the city in various forms;⁴ and in spite of the fact that philosophy made its home with her, she produced only four thinkers of any

¹ The influence may be shown in a negative way by the neglect of Democritus and the loss of his work. It might well have been otherwise if he had settled at Athens. Demetrius Phalereus, a credible author (ap. Diog. L. IX, 37), denied that Democritus ever went to Athens, but Demetrius Magnes (*ibid.* 36) asserted that he did come and was ignored. Plato never mentions him but it is incredible that he had never heard of Atomism.

² On the Athens of this period, Holm, *The History of Greece*, II, chaps. xx and xxvi, is most enlightening.

³ When Pericles (*Thuc.*, II, 40) said φιλοσοφούμεν ἀνευ μαλακίας (it sounds like him), he was perhaps defending his association with Anaxagoras under the cloak of a patriotic boast; but his audience probably understood the verb in its non-technical sense as expressing merely a love of wisdom or skill in a general way. A little later (*ibid.*, 3) he gives the ordinary view that ignorance brings boldness, calculation brings hesitancy. Cleon (*idem.*, III, 37, 3) frankly prefers ignorance with moderation to unbridled cleverness, for "inferior men as a general rule manage cities better than the more intelligent." Even Euripides was too "advanced" to be really popular at Athens. In *Phaed.*, 64 b, Simmias says that most people think philosophers are practically dead and would get only what they deserve if they suffered death; this is of course playful but the very playfulness is instructive.

⁴ Diog. L. (IX, 52, 54) says that Protagoras was also prosecuted and condemned; but that seems hardly likely in view of *Meno*, 91 e 9, 10. There is a credible tradition that Phidias was also condemned by his fellow-citizens, but if the charge was impiety, it must have been a pretense; cf. Aristoph., *Pax*, 605, Philochorus *ap. schol.* in Aristoph., *Pax* (Dindorf), IV, III, p. 78, Plutarch, *Pericles*, 31.

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note—Archelaus,⁵ Socrates, Antisthenes, and Plato. Under these circumstances one is likely to wonder why philosophy ever came to Athens, or stayed there when it did come. But apparently with philosophy as such the Athenians had no quarrel—at least no quarrel that was justiciable. Moreover it was part of their tradition to let men think as they saw fit.⁶ We shall probably never be sure of the real reasons that led to the prosecution of these philosophers, but in any case it was as individuals and not as a profession that they suffered at the hands of the democracy. The Athenians did not, like the Romans, expel the whole tribe of philosophers.⁷ But we shall probably not be far wrong in surmising that the unfortunate individuals had either interfered with the city's established religious practices or been too closely associated with traitorous aristocrats, or both. The long continued gravity with which the mutilation of the Hermae was treated shows how deeply the democracy could be stirred by a combination of religious horror and political fear.

Yet about the middle of the fifth century philosophers began coming to Athens and they kept on coming. Anaxagoras was probably the first and it seems likely that he was brought there by Pericles, perhaps about 460 B.C. Archelaus, a native Athenian, must have begun his studies not

⁵ The supposition that Archelaus was a Milesian (Diog. L., II, 17, 7, accepted by Ueberweg-Heintze and by Myres in *Anthropology and the Classics*, p. 156) cannot be allowed in view of the weight of ancient testimony against it.

⁶ In the Funeral Oration, Thucydides makes Pericles say: "The freedom which we enjoy in our government extends also to our ordinary life" (II, 37, 2, trans. Crawley), and a little later he uses the phrase "living without restraint" (II, 39, 1). But he makes it plain that they obeyed the laws and in their practice even recognized unwritten laws. Their freedom was self-restraint, but also a refusal to organize efficiently.

⁷ cf. Thuc., II, 39, 1: "Our city is wide open and we never by acts against aliens deprive anyone of opportunity to learn or observe." An alien act would have expelled all the Sophists. The Athenians encouraged immigration for commercial reasons.

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long afterward, for he was a pupil of Anaxagoras and a teacher of Socrates. Parmenides and Zeno of Elea probably visited the city about the middle of the century; and Socrates, who must have been already interested in philosophy, met them at that time. Protagoras made two visits to the city, probably before 432 B.C., and Gorgias came on his embassy in 427 B.C. Diogenes of Apollonia must have been there before the production of the *Clouds* of Aristophanes in 423 B.C., as the character of Socrates in the play expounds several of his doctrines. Of Hippias and Prodicus, Hippon and Melissus, and many lesser lights we know practically nothing; Leucippus and Philolaus probably never were in Athens. Special causes brought some of the foreigners; but the policy and character of Pericles, the outstanding position of Athens, and the increasing use of rhetoric, especially on the part of the rich aristocratic minority, no doubt exercised a general attraction.

3. The diversity of views maintained by these thinkers may well have produced a sort of mental dizziness in philosophic circles. If we consider merely the third quarter of the century, we find progressive cosmology (Empedocles, Anaxagoras), reactionary and eclectic cosmology (Archelaus and Diogenes), Eleatic dialectic (Parmenides, Zeno, Melissus), the Sophists and Socrates; and to this mixture we ought to add a good handful of mysticism from Orphic and Pythagorean sources, and a pinch of pure mathematics and astronomy. Such multifarious activity in so short a span of years and in such close proximity could not produce fruitful results; and the whole half-century is, from the philosophic point of view, chiefly a period of transition. It is like a stream which, augmented by several others almost at the same spot, broadens in-

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stead of deepening to take care of the increased volume, and then immediately falls through a rapids filled with eddies and cross currents. Within this reach philosophy had no character because it had many characters. But there emerged from the welter two quite definite courses: the atomistic, which successfully carried on the old cosmology much improved by its late association with other interests;⁸ and the idealistic, which led through Socrates and Plato. The Pythagoreans for a time carried on their traditional independence, but soon became virtually merged with the Idealists.

It should now be apparent that the Sophists and Socrates did not have the last half of the century to themselves, as is frequently to be inferred from the histories of philosophy. The old cosmology lived on amid the new interests. Socrates talked with Parmenides. Protagoras and Empedocles may very likely have met at Thurii. Probably Anaxagoras did not leave Athens till shortly before the outbreak of the Peloponnesian War, possibly as late as 432 B.C. And even after the death of these old great ones, minor figures prolonged the Ionian and the Eleatic Schools with reactionary, radical, or eclectic features. The Sophists then represent but one among several contemporary tendencies.

4. Philosophically speaking, the Sophists began as the radical party;⁹ but like most radical parties, they were a mongrel lot, united, if at all, by their opposition to the

⁸ The older view which treated Democritus as a presocratic has been generally superseded. He was probably a younger contemporary of Plato, and the fragments of his work show quite conclusively that he was influenced by ethical and epistemological considerations in a form that was typical of the Socratic age.

⁹ It seems probable that Gorgias and Protagoras, like Socrates, had been interested in natural science before they turned to humanistic studies—Gorgias an Empedoclean, Protagoras a Heraclitean.

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established order. Now the established order in philosophy at the time was cosmology, and with respect to it the Sophists took up a hostile attitude which ranged from the mild relativism of Protagoras to the stark nihilism of Gorgias. Again as usual in such situations, the radicals were immensely strengthened by the extremists among the conservatives, who were represented at the time chiefly by the Eleatics. The experiment of Parmenides in applying the principles of rhetorical argumentation to cosmological inquiry had produced a deep impression, especially at Athens.¹⁰ But this new method, as employed by the followers of Parmenides, had by its vigorous logic forced conclusions so violently opposed to the commonest sense that there was a generally unfavorable reaction not only to it but to all cosmology. And the extravagant claims of such a scientist as Empedocles must have aided the reaction from another quarter.¹¹ The conflicting and irreconcilable solutions of the cosmological problem, together with the obvious absurdity and uselessness of the dialectical puzzles that were now put forward as explanations of nature, began by throwing doubt on the whole construction, and finally induced a feeling of weariness and disgust with natural science in general. The inevitable result was scepticism, evidence of which is found directly in the Sophists and indirectly in the attempts of such thinkers as Philolaus, Socrates, and Democritus, to escape from it by developing a theory of knowledge.

Of course, beside opposition to cosmology there were several other factors that led to the rise of Sophistry. In the breakdown of the older learning, new interests came to the fore and got room to develop. We can distinguish

¹⁰ Perhaps largely due to the presence of Zeno.

¹¹ See above, p. 92.

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what are now called grammar (Prodicus), rhetoric (Gorgias), ethics (Socrates, Gorgias), and epistemology (Protagoras, Socrates); and each of these new subjects had its professors. Now all these subjects have one thing in common, as compared with the previous cosmology: they are concerned in some way with human activity. The main concern of cosmology had been the great elements of nature; but after the Milesians there had been a growing interest in knowledge and conduct which culminated in Anaxagoras' choice of Mind as the principle. When natural science fell into disrepute, the humanistic studies immediately came to the front, and it is therefore proper to think of the Sophists and Socrates as starting a movement whose negative side was a revolt against cosmology and whose positive side was Humanism. It would furthermore be true that, while there were other old and new tendencies, the predominant emphasis of the last quarter of the century was on human activity.

5. The positive and negative aspects of the new movement are well expressed in the antithesis between nature (*φύσις*) and law (*νόμος*), which was characteristic of the period.¹² We have seen reason to suppose that the earlier

¹² Plato is historically correct when he makes Hippias say: "Law, a tyrant over men, compels many things contrary to nature" (*Prot.*, 337 d). For a full discussion of the antithesis see *Gorg.*, 482 e-492 c; and Antiphon the Sophist in *Oxyrh. Papyri*, Vol. XI, No. 1364. Beardslee (*The use of ΦΥΣΙΣ*, etc., p. 70) says that the various expressions of this antithesis "can be reduced to four contrasts, that between character and training, that between reality and the conventional but generally erroneous interpretation of that reality, that between the normal and the erratic, that between the self-directed and that which obeys impulses from without." I doubt whether Professor Burnet (*Gk. Phil.*, p. 106) is right in making Herodotus the exponent of this spirit. What Herodotus (III, 38) says is that if you should give men a choice of all the religious practices of the world, each would choose those of his own nation. That sounds more like Xenophanes and Ionia than Protagoras and Hippias and Athens; there is no hint in Herodotus that such conventions are "unnatural." cf. Myres in *Anthropology and the Classics*, p. 158.

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natural inquiry had thought of nature in terms of human activity. At first the attitude of the investigator, like Heraclitus, had been that nature was everything; and if the terms of human activity could be extended to nature, it was because man was only a part of nature, and the whole would behave like any of its parts. The practical side of the inquiry was merely the adjustment of the part to the whole. But Anaxagoras seemed to appreciate that the problem was not quite so simple. Natural regularity, for example, had no analogue in the mental activity of men, and mind had a power of self-direction which was not present in things. The question was how to find room in the same world for both natural regularity and purposive intelligence; and Anaxagoras attempted to answer the question by building up a mechanical system as far as it would go, and then superimposing mind upon it. But at least this means that the old cosmology at the end had been able to develop some idea of mechanical regularity. Moreover the new antithesis between nature and law was founded on the assumption that nature is regular in a sense that is inapplicable to intelligence; and we must suppose that this antithesis was not generally meant as denying the scientific view of natural regularity. What it did mean was, first, that man and nature were two different things; and second, that investigation of nature was useless for understanding man, who was after all the *raison d'être* of the whole inquiry. The relation of man to the world had become an uninteresting enigma, and thinkers turned their attention to human beings by and for themselves.

6. In so doing, philosophy was only acknowledging formally what people had been thinking about for some time. The Greeks had been growing conscious of themselves

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and their powers, and they were trying to find how far those powers could go. One of the mottoes at Delphi had been "Know thyself," and Heraclitus said "I investigated myself." Parmenides had considered human reason and come to the conclusion that "it must needs be that what can be thought and spoken of is"—that thought had some kind of a bearing on reality. In another sphere, Solon, an Athenian man, had done what had previously been considered a divine prerogative, namely, given laws to his fatherland; and Pindar sang of "Law the King of all"—not natural rights or crystallized custom or legislative enactment, but νόμος, constitutive law based on a high sense of justice.¹³ The Persian Wars had shown the power of unaided manly valor. "Not only the cringing priests at Delphi, but the common Greek citizen looked up with reverential awe to great Moguls like Croesus and Cambyzes";¹⁴ and yet when the Persians came, the Greeks with far fewer forces turned them back on land and sea, and their awe began to turn into a contempt which materialized about eighty years later when a band of ten thousand Greeks ventured to march into the heart of the great Persian Empire. Herodotus manifests this feeling of superiority to all Oriental civilization, that of Lydia and of Egypt as well as of Persia. "Only in Greece," his atti-

¹³ Both Herodotus (III, 38) and Plato (*Gorg.*, 484 b) seem to misinterpret Pindar's thought to suit their own purposes. The historian uses νόμος in the sense of custom or convention, which is just what Pindar does not mean; and the philosopher uses it in the sense of natural justice, which would probably have been meaningless to the poet. What Pindar seems to have in mind was law that was above all customary laws, based on a high sense of justice only applicable to a superman like Heracles. But evidently the line was a common quotation and could carry any convenient meaning, as Professor Burnet observes (*Gk. Phil.*, p. 107, n. 1).

¹⁴ Zimmern, p. 179. Speaking of the Athenian Empire that grew up out of the Persian menace, Pericles remarks: ἀνδρες αὐτὰ ἐκτίσαντο (Thucyd., II, 43, 1). So also happiness is not the gift of the gods but comes from freedom and freedom from valor (*ibid.*, 4).

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tude assumes, "is there mastery of man over nature, and that not because nature is less strong, but because Greek man is strong enough to dominate it."¹⁵ It was exactly this feeling of domination over nature that Empedocles had exaggerated in several wild predictions of his prowess. Self-reliance became a virtue and the strong man, of whom Heracles was the type, must have been a popular theme;¹⁶ Euripides in his play of that name sounds a warning that such superior strength ought to justify itself in the service of humanity. It was under such circumstances that Anaxagoras made mind the ruler of all things and Protagoras made man the measure of all things.

Ostensibly therefore the Sophistic movement was mainly concerned with the investigation of man and his capacities; but owing to its reaction against cosmology, it investigated man as man and without reference to his position in the universe. Now there is no reason why opposition to natural science should carry with it hostility to religion—the two are frequently found in inverse proportion. No other evidence therefore can more strikingly attest the degree to which cosmology had absorbed religion among the philosophically minded than the fact that, when cosmology was thrown aside in the Socratic age, large numbers of them could treat of the great questions of human life without any reference to religious considerations.¹⁷ And so, in the absence of both cosmological and religious com-

¹⁵ Myres in *Anthropology and the Classics*, p. 151 (quoted by Zimmern).

¹⁶ The old ethico-religious doctrine that no man was self-sufficient or completely happy is given in Pindar, *Nem.*, VII, 55, Herod., I, 32. But Pericles in the Funeral Oration takes pride in the fact that the Athenians do not trust so much in external circumstances as in their own native spirit (II, 39, 1), and tend to become self-sufficient individuals (II, 41, 1).

¹⁷ There is an instructive passage on the general topic in Lecky, *History of European Morals*, I, p. 161. Outside the philosophic circles, external conditions had helped to weaken the ancient religion and produce scepticism, e.g. human lawgivers, the position of the Delphic Oracle, and the rise of the commercial spirit.

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plications, their problem was this: leaving out of account everything else and considering only man's actions, what does it mean to be a human being? or, given human activity, what principles may be discovered in it? Human life was analyzed in much the same way as a physiologist dissects a frog, and the result was a secular, unmetaphysical ethics.

7. However, we should miss part of the historical value of the humanistic movement, if we went no further than its professions. The problem of the ultimate nature of the universe can never be wholly superseded. Many of the topics which engaged the attention of the Sophists, being partly the result of dissatisfaction with previous natural science, in reality had implications that reached out far beyond their particular provinces, and thus helped to lay the foundations for a new explanation of the world, in which science held its rightful place. The famous doctrine of Protagoras that "man is the measure of all things, of things that are that they are, of things that are not that they are not" is certainly comprehensive enough to include the data of science; indeed the point of the assertion, which deals with the existence or non-existence of things, shows that the objects of which man was the measure might be the same as those which had formed the matter of scientific dispute. Aristotle even represents Protagoras as arguing against the geometrical proposition that a straight line can touch a circle at only one point.¹⁸ Probably Protagoras did not develop a comprehensive theory of reality; but his doctrine could be used as the basis for such a theory, as Plato saw when he elaborated a thoroughgoing sensationalism from it in the *Theaetetus*. And so investigation of the conditions of knowledge, the functions

¹⁸ *Met.*, III, 2. 998 a 2.

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and powers of the mind, the nature of society, became historically a sort of propaedeutic to a more complete and systematic philosophy of the world.

8. Individually the Sophists were merely professional wise men, that is, men who made a business of learning, though that was not necessarily their only occupation. Both the term and the thing appear to be old; but the name does not seem to be used for philosophers before the Periclean Age, though after it became current in this sense, it was applied to earlier personages who had claimed to be wise.¹⁹ In many respects the Sophists were like the cosmologists. They frequently travelled about, but so had Xenophanes, Pythagoras, and Empedocles; they claimed surpassing wisdom, but so had most of the cosmologists; they taught their doctrines, and in this again they were like the earlier thinkers. But there were two novel features in the practice of the Sophists: the wisdom they taught was practical in a new sense, and most of them took money for their instruction.

The wisdom of the physiologues had a practical bearing in teaching men how they ought to live in a world organized on such and such principles, but the wisdom itself was not ordinarily practical.²⁰ On the other hand, the knowledge which the Sophists professed to impart was always

¹⁹ The word is used by Aeschylus (*Prometh.*, 62, 943) and Pindar (*Isth.*, 4, 31) of a clever artist or artisan. Herodotus (I, 29; II, 49; IV, 95) calls Solon, Pythagoras, and the founders of the Dionysiac cult sophists. Diogenes of Apollonia (*ap. Simpl., Phys.*, 151, 20 *DFV*, p. 329) and Xenophon (*Mem.*, I, 1, 11) applied the term to the physiologues or cosmologists. It was also given to Homer and Hesiod, and all musical artists, and Plato uses it of geometers (*Meno*, 85 b 5). Probably Plato (*Protag.*, 316 d-317 d, 348 e-349 a) is right in making Protagoras the first to call himself a sophist in the new sense.

²⁰ We might make a partial exception for Heraclitus who demonstrated that drunkenness was unscientific, and for Empedocles who claimed that his cosmology would discover "drugs that are a defense against the evils of old age."

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based on some human activity, such as speech or thought or politics, and the purpose of it was to make those who had it "better," that is, more capable and successful in the particular activity.²¹ We might therefore say that while the cosmologists had attempted to enable men to take advantage of nature, the Sophists undertook to teach men how to take advantage of organized society.

It was certainly time for Philosophy to explore the human being with his vast import for the meaning of the world; and we could even forgive the Sophists for neglecting that import if they had gone straightforwardly to work in investigating humanity. But the truth is that the Sophists, as a rule, were not philosophers at all; they were merely philosophical opportunists. That is only another way of saying that there was a demand for instruction in these subjects, and the Sophists were men who undertook to satisfy that demand. Probably Protagoras and Gorgias, and possibly Hippias and Prodicus, were genuinely interested in their researches; but the success they gained at Athens showed the possibilities of lecturing, and later Sophists did not scruple to put up for sale what was merely a superficial cleverness frequently mixed with a considerable amount of pretense.

9. Of course no Athenian gentleman would have stooped to teach for money, or become a "professional" of any sort; and so the new masters were foreigners.²² But the strangest part of the whole business was not that these foreigners accepted money, but that so many Athenians would pay it. What was this new interest in learning in a city that had never worried about instructing its youth, save in the art of war? Certainly it was not the Athenian

²¹ They were thus the authors of the vocational training idea.

²² They came from Leontini, Agrigentum, Thurii, Elis, Corinth, Ceos, Paros, Abdera, Chalcedon, and even Macedonia and Aeolia.

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workman clamoring for an education; he had no money to spend on such an unnecessary thing, and he undoubtedly disbelieved in it anyway, as tending toward impiety. Probably Pericles himself started the practice by his association with Anaxagoras, from whom he got "whatever was of advantage for the art of speech."²³ His success would appeal to two classes of people: those who wished to become political leaders, like Critias and Alcibiades,²⁴ and those who wished to oppose the democracy either in order to protect themselves or to put the aristocracy back in the saddle. These two classes would not necessarily be distinct, as the purely democratic leaders like Cleon would probably not associate with Sophists; and as a matter of fact, the clientèle seems to have been almost exclusively the aristocrats. There were no doubt some of these who were sincerely interested in philosophical questions regarding knowledge, conduct, and government, or Socrates would not have found as many opportunities for conversation as he did;²⁵ and we must admit too that the discussion of the Sophists tended to bring these questions before an ever-widening circle in the state and so acted as a medium of culture.

In a city that was traditionally careless in education,

²³ Plato, *Phaedr.*, 270 a 9. 10. τέχνη τῶν λόγων included argumentation as well as rhetorical devices.

²⁴ Xen., *Mem.*, I, 2, says that these two "had set out from the very beginning to govern the city." But the family of Critias belonged to the moderate liberal party and we need not credit him in his early association with the Sophists with the cruel and reactionary designs that he carried out as leader of the Thirty. The great debates of the Peloponnesian War furnished wonderful opportunities for such men to gain power. "Such occasions brought to the fore a new type of public man, who had served no apprenticeship of responsibility in the business affairs of state, at best the thinker and the moralist, but too often only the accomplished Parliamentary. . . ." Zimmern, p. 169.

²⁵ The associates of Socrates were also from the rich, leisured class (Plato, *Apol.*, 23 c 3); but these are to be distinguished from the close friends named in *Phaedr.*, 59 b.

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these lectures and the arguments they evoked undoubtedly paved the way for the Academy and the Lyceum, established in the next century as permanent institutions of instruction. But the sophistic teaching itself was too unorganized and depended too closely on the demand for it, to become a free and fearless agency of philosophy. More and more its rhetoric turned into oratorical devices to cajole a mob, and its arguments into spurious logic. Moreover these were minor matters compared with the devastating and general effect of the necessity to be practical in order to satisfy the demand for instruction; for this meant that the inquiry into the nature of man was limited strictly to man's activities. What the Athenian nobles wanted to know was how to succeed in certain pursuits, and the Sophists therefore had to study how men did succeed and to invent new ways of succeeding under the same conditions. Philosophical inquiry in their hands thus became like some modern practical psychology: first conduct tests to determine what kind of advertising pays and then teach people how to advertise that way. The greatest human aspirations, the deepest wellsprings of action were ruled out of court; the Sophists could not go beyond activities, the external manifestations of men. Hence the "goodness" which they professed to teach was usually a rule-of-thumb cleverness, and the name was a misnomer skilfully advertised. They also claimed that virtue was knowledge, but that again was part of their advertisement and in their mouths amounted to little more than the sombre platitude: before you can do anything well, you have to know how. In short, with the exception of a very few of the earliest, the Sophists represented intellectual insincerity, and that in all scientific and reflective

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inquiry must be regarded as the prostitution of purity itself.

From the historical point of view, the real pity of the situation is that the Sophists failed as leaders of the humanistic movement. When they began their teaching, there was undoubtedly a healthy and a growing interest in political and social problems. Athens, at the head of her League and to all intents an imperial city, was inwardly developing toward a more and more complete democracy. At a time when this city was the foremost in all Greece, her burgesses were being called upon to decide questions of far-reaching and vital concern, not only to themselves, but to a large part of the Greek world. In the legislative assembly and the probouleutic council, in political clubs or before the law-courts, there was constantly brought into play every art by which one man endeavors to realize his desire through the action of his fellows. Persuasive rhetoric was not a new thing, even in Athens, though Gorgias, when he came to the city, was able to elaborate it considerably with devices which had been artistically worked out in his native Sicily. But external circumstances, such as the spread of the city's foreign power and the increase of public business which according to the Constitution now necessitated forensic discussion, greatly extended the scope of oratory. The same causes, aided by commercial expansion, produced an interest, general among the better class of citizens, in the questions of the nature and validity of law, the proper excellence of a citizen, the position of women, the comparative usefulness of various polities, and even the fundamental meaning of civilization. Hence it was that not only the more select and advanced thinkers but also the general run of educated citizens turned to political and

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ethical problems with an enthusiasm and a seriousness and a unanimity which has probably never been paralleled. But the Sophists, in lieu of guiding this tremendous intellectual activity, pandered to it for their own advantage; and instead of giving it a healthy stimulus, they confined it to the wealthy class. They taught the more gifted how to succeed on the level of the least intelligent, and the effect of their teaching was thus to emphasize and perpetrate the worst features of a popular movement.

10. What the Sophists might have been if either external conditions or human nature had been different, Socrates showed. Like them he found himself in opposition to the old cosmology and in sympathy with the new humanism. But he maintained an absolutely independent position and was therefore free to investigate as he chose.²⁶ His refusal to accept fees is merely an indication of something much deeper, an effect, not a cause; for it shows that, while the teachers about him were willing to take selfish aggrandizement from a widespread interest in philosophical subjects, he alone pursued philosophy as a philosopher, responding naturally to the circumstances of his time and place, yet wholly engrossed in a fearless search for truth. This by itself is enough to differentiate him from the Sophists; it was a spiritual differentia, of which the refusal to take monetary remuneration was only an outward sign. The same difference of spirit produced a significant divergence in the scope and nature of their inquiries. Socrates was ever trying to discover the real man under the surface of his various activities, and "the real man" included

²⁶ Instead of lecturing to exclusive audiences, he was to be found *ἐν ἀγορᾷ* (Plat. *Apol.*, 17 c 11), *ἐν τῷ φανερώ*, where τοῖς βουλομένοις ἐξῆν ἀκούειν (Xen., *Mem.*, I, 1, 10). He visited painters, sculptors, armorers (Xen., *Mem.*, III, 10), politicians, poets, and artisans (Plat., *Apol.*, 21, 22). His associates were rich because they alone had leisure to follow him about.

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motives and aspirations that were not practical in the sophistic sense. Moreover Socrates claimed that the professed knowledge of the Sophists, which they had set up in place of cosmology, was not knowledge in the philosophical sense at all—it was merely intuitive skill and therefore could not be taught.²⁷ Goodness was of the whole man, and knowledge, if there was such a thing, was capable of formulation in universal terms.

11. It will help us to understand the real import of Sophistry if we take a final glance at its subsequent historical course. It was probably most potent in the last quarter of the fifth century. In the next century there were no Sophists in the former sense of the term, their place as purveyors of education being occupied by the philosophic schools, of which the chief were those of Aristippus the Cyrenaic, Antisthenes the Cynic, Euclides of Megara, Plato, Isocrates, and Aristotle. But if there were no Sophists in the strict acceptation, the thing called Sophistry apparently did still exist, for references to it are found in Plato, Isocrates, and Aristotle. These references, however, apply to two somewhat different manifestations of one and the same spirit, and they may be distinguished as Eristic and Rhetoric. Eristic was the sophistic tendency for disputatious quibbling carried over into philosophy, and as such it characterized chiefly the work of the Megaric School, whose arguments seem to have formed the main source of Aristotle's work *On Sophistic Fallacies*. But there are other references, especially in Plato, which cannot be directed against the Megarics and which imply that Sophistry continued to exist in some way as a political force. Now Thucydides puts into the mouth of the dema-

²⁷ That kind of skill comes *θελα μοιρα* (*Meno*, 99 e 6), by a kind of divine grace which is equivalent to chance.

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gogue Cleon words which can only mean that Sophistry, after having been developed as a weapon of the nobles, had become the fashion of the democracy. Speaking in the Assembly, Cleon complains that the people are habituating themselves to be "spectators of arguments, auditors of deeds"; "the highest ambition of every man is to have the ability to speak himself, or short of that, to vie with those who do speak by not seeming to lag behind their opinions . . ., simply carried away by the pleasure of hearing some one talk, more like those who sit and listen to Sophists than those who are deliberating for a city."²⁸ Here the speaker is referring to a popular delight in mere political rhetoric adapted to persuade a mob, and to the state of mind that can be persuaded by such rhetoric. After this we can understand what Plato, writing perhaps in the second decade of the next century, means when he says that the public itself is the greatest Sophist of all.²⁹ Sophistry now is the art of seeming to convince people of what they actually want, by means of specious cleverness, and as such, it is the practice of the democracy. Surely it is a piquant irony of fate that the very class which had objected to the Sophists as corrupters of the youth and purveyors of subversive ideas should have urged on its own ruin by adopting their devices.

12. Out of the multifarious philosophical activity which attended the weakening of cosmology and the rise of the humanistic interest, there stand several figures of sufficient intellectual caliber and historical importance to deserve individual mention: Zeno and Melissus, defenders of the Eleatic School of Parmenides; Leucippus, who utilized the Eleatic views in originating a true atomism; Prota-

²⁸ Thucyd., III, 38, 4-7.

²⁹ *Rep.*, VI, 492 a 7.

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goras and Gorgias, early Sophists who attacked the general position of cosmological science; Philolaus, a member of the Pythagorean Order, who revised its doctrines in the light of recent developments in philosophy; and Socrates, who sympathized with the Sophists in their humanistic emphasis and with the Pythagoreans in their doctrine of soul, but was too original to bind himself to any group. In order to treat Atomism as it was actually given to the philosophical tradition and as a system, I shall violate the historical order by reserving Leucippus for consideration with Democritus. Separate chapters will be devoted to Philolaus and to Socrates. It remains therefore for us to notice more briefly the views of Zeno and Melissus, Protagoras and Gorgias.

13. We have seen how Empedocles and Anaxagoras attempted to escape from Parmenides' denial of motion by means of the assumption that the world is not ultimately one, as he maintained, but many. The contemporary Pythagoreans may have held similar views, and Leucippus made pluralism the foundation of his Atomism. Hence it was probably the general view of all thinkers capable of appreciating the logic of Parmenides that his conclusion could be successfully avoided by the hypothesis that the world is ultimately more than one thing. And the task which Zeno and Melissus, younger followers of Parmenides, undertook was to defend the Eleatic system against this pluralistic hypothesis.

Zeno was a native of Elea, where he had been a pupil of Parmenides; but he visited Athens, and it is probable that he spent some time there. At any rate his views were well known, and later writers give quotations from his works. All the evidence we have goes to show that he did not make any positive contribution to the Eleatic doc-

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trine, but contented himself with attacks on the positions of his opponents. His method seems to have consisted in taking a presupposition of these opponents and reducing it to consequences that were either contradictory or absurd. For this reason Aristotle called him the inventor of dialectic;³⁰ but that is a very misleading statement, made from Aristotle's particular point of view (it would not be true of dialectic in Plato's sense), and the truth which it tends to hide is simply that Zeno extended the use of purely logical argumentation, employed constructively in the main by Parmenides, to destroy opposing assumptions.

Zeno's arguments fall into two general classes, (1) those that deal with the mere assumption of multiplicity in the world (space), and (2) those that introduce motion (space and time). The former class attempts to prove that What-is cannot be composed of parts, (a) because with infinite divisibility these parts would have to be so small as to have no magnitude, and yet so great as to be infinite; (b) because if they had no magnitude, their addition and subtraction would make no difference, and they would be nothing at all; (c) because they would have to be "just as many as they are" and thus finite in number, but also infinite in number because there would always be something between any two of them; (d) because everything that existed would have to be in something and then space would be in space. These arguments are thus directed against the view that the world is composed of points and is spatially discrete.

The other class of arguments, which have become more celebrated, deal with the same assumption of discreteness as complicated by the further assumption of motion. (a)

³⁰ In a work called *The Sophist*, quoted by Diog., IX, 25; VIII, 57.

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You cannot cross a race-course, because you would first have to travel half the distance, and the half of the half, and so on *ad infinitum*, and you cannot pass through an infinite number of points in any finite time. (b) Achilles can never overtake the tortoise, because he will first have to reach the starting-point of the tortoise, and by that time the tortoise will have reached a new starting-point, and so on *ad infinitum*. (c) The flying arrow is at rest, for at any given moment it occupies a space equal to its own length, and such a position is rest. (d) If we take three rows of bodies (lines *A*, *B*, *C*), one of which, *A*, is at rest, while the second, *B*, moves past *A* in one direction, and the third, *C*, moves in the opposite direction with equal velocity, then for any position *B* will have passed twice as many points of *C* as of *A*, for which it will need twice as many moments; but the times are the same, so that half the time equals double the time.

It is important to realize that these arguments are not what they seem—mere paradoxical quibbles, which can be vanquished “with a grin.” They raise the highly significant and troublesome problems of continuity and infinity, and, when properly interpreted, are valid on the assumption that finite spaces consist of a finite number of points, and finite times of a finite number of instants. Bertrand Russell³¹ has shown that in consequence of Zeno’s arguments we must hold either (1) that space and time do consist of points and instants, but the number of them in any finite interval is infinite—a view maintained by modern mathematicians; or (2) that space and time do not consist of points and instants at all—a position taken by certain philosophers, of whom Bergson is an example; or (3)

³¹ *Scientific Method in Philosophy*, p. 178.

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that space and time (motion) are not realities—the conclusion which Zeno probably intended.

14. Melissus was a native of Samos, and so far as we know had no connection with the city of Elea. He did however adopt the main tenets of Parmenides, and is therefore classed as belonging to the Eleatic School of Philosophy. To the historian of philosophy he is memorable for one positive contribution and for one point of attack on the opponents of Eleaticism. The former of these consisted in an argument to prove that, contrary to Parmenides, What-is must be infinite; for if it were limited (finite), it could only be limited by empty space, and there is no such thing as empty space. The other point worth mentioning is that Melissus attacked his pluralistic opponents on the ground that "if there were many things, they would have to be such as the one is."³² Melissus meant this argument as a *reductio ad absurdum* of pluralism; but Leucippus accepted it as one of the foundation-stones of his atomism.

15. Protagoras came from Abdera in Thrace, the city which later became the home of the Atomist School. He was probably the first to adopt the title of Sophist; and we know from Plato that he paid at least two visits to Athens, where his presence excited the most lively interest, but we do not know how long he remained in the city. A story is told by later writers that he was condemned for impiety and all copies of his book were burned, but that is highly improbable. Pericles entrusted him with the important task of framing a constitution for the colony of Thurii; and this fact is significant in showing that Protagoras was regarded as both trustworthy and expert in the principles of government. It is impossible that such a man

³² frag. 8, *sub fin.*, *DFV*, p. 148.

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should have preached views which were morally or politically subversive.

The doctrine for which Protagoras became most famous is that "man is the measure of all things, of things that are that they are, and of things that are not that they are not." The statement in this form is not a lucid one, but its basic meaning is fairly certain. The general aim of cosmological science had been to discover what Heraclitus had acutely called the "measures" of natural processes, that is, the fixed quantities or modes of behavior which regulated changes in the world. But in three impressive ways this inquiry had issued in disappointment. (1) Parmenides had argued that What-is must be quite different from the phenomena of all ordinary experience, so different in fact that truth is a divine revelation and sense experience wholly wrong. (2) Mathematicians, probably within the Pythagorean Order, had discovered incommensurability, which meant that it is impossible to measure the sides and the diagonal of a square, for instance, in the same units. (3) Every searcher after natural laws had brought forth some new necessity of nature, which was quite different from all previous accounts. In the light of these facts, Protagoras asserted that ordinary experience must judge what is and what is not, that for all practical purposes you can measure squares and their diagonals or anything else, and that in general the solid, definite laws of mankind had not been superseded as a guide for action by the supposititious natural regulations that every investigator had brought out of his closet.

It is difficult to find how far Protagoras went in the interpretation of this fundamental position, but Plato is no doubt right in explaining it to mean that things are to me as they appear to me, and to you as they appear to

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you; that is, the doctrine probably included a relativistic aspect. On the other hand, Protagoras was a champion of law and tradition, and he appears to have believed that while each man may have his own truth, one view may be better than another. As Burnet puts it, "The less he could admit anything to be truer than anything else, the more sure he felt that we must cleave to what is normal and generally recognised."³³ Protagoras did not carry his relativism into morality, and he was not an anarchist.

16. Gorgias of Leontini in Sicily, a few years junior to Protagoras, was less interested in politics than in rhetoric; and he is credited with having introduced into Athens the rhetorical devices which had been elaborated in his home.³⁴ His importance to the history of philosophy lies in the evidence he furnishes of the lengths to which the reaction against cosmological science was pushed. We are told that he sought to prove (1) that there is nothing; (2) that even if there were anything, we could not know it; (3) that even if we could know it, we could not communicate our knowledge to one another.

17. While Zeno and Melissus were Eleatics and thus in a sense belonged to the cosmological tradition, against which Sophistry was a protest, yet they themselves unconsciously instigated the reaction by destroying the experiential foundations on which cosmology was built. There could be no real knowledge of the world without sense experience and motion, both of which were attacked by the Eleatics. And furthermore, their arguments about what is and what is not, through the ambiguity of the verb "to be," could easily be shifted so as to give comfort to their enemies, as Gorgias showed when he asserted there *is*

³³ *Gk. Phil.*, I, p. 117.

³⁴ cf. above, p. 68.

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nothing, and Leucippus in his doctrine that what is not (empty space) *is*. It is therefore not surprising to find that the extreme of opposition to cosmological science, maintained by the Sophist Gorgias, was based on the arguments of the younger Eleatics, Zeno and Melissus.

CHAPTER IX

PHILOLAUS

1. WITHIN the Pythagorean Order and in philosophical circles touched by its influence during this period, there seems to have been an important and fruitful development of the basic concepts of science, although there was no further actual investigation of nature. The Pythagoreans were under the necessity of modifying and extending their traditional theories in consequence of two recent features in philosophy. Empedocles had concentrated the attention of cosmologists on the problems of terrestrial processes, such as are observable in plants and animals, and by his doctrine of elements had offered an explanation of the phenomena of growth and death. It was impossible for subsequent philosophers to ignore such questions or content themselves any longer in the main with theories about the creation and movements of the heavenly bodies. The Pythagoreans had to meet this situation and to put forward some sort of an explanation of earthly objects and processes. In the second place, the new humanistic tendency had as its point of departure a dissatisfaction with natural science, owing to the alleged impossibility of discovering any definite and dependable information about the physical world. The Sophists simply accepted this prevalent incredulity and turned their backs on nature, or tried to, by elaborating a structure whose essence was νόμος (human convention) as contrasted with φύσις.

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But it was necessary for the Pythagoreans, as philosophers, to combat the sceptical attitude, if their ancient system was to stand the test of contemporary criticism; they had to justify the process of knowledge and so establish the possibility of their scientific concepts.

2. The former of these changes, concerned with the explanation of terrestrial phenomena, was bound up with the whole subject of material substrates. We have seen reason to suppose that Pythagoras believed the world was brought into being by the breaking up of an original mass through the introduction of air acting as a void.¹ But Empedocles had demonstrated that air was not a void which could separate things; it was a corporeal element, like fire. Accordingly, it was necessary for the Pythagoreans to revise their theories of the materials out of which, and the process by which, the different objects of the world were created. With regard to the materials, Philolaus, who seems to have been the most prominent thinker in the Order at the time, simply accepted the four Empedoclean elements but apparently made very little use of them in his system.² With regard to the process, he substituted for the simple and general Empedoclean notion of mixture the special activity of harmonizing, probably because this was in line with traditional Pythagorean cosmology and emphasized the idea of order. He held that the whole world and the objects in it³ had been "fitted together" or

¹ See above, p. 40.

² Philolaus, frag. 12, *DFV*, p. 244; cf. also his physiology, which presupposes the four elements identified with the old opposites, hot, cold, moist, dry, Menon, *Anon. Lond.*, 18. 8, *DFV*, p. 238. I have given a translation of the fragments and briefly discussed their authenticity in the Appendix.

³ Philolaus carefully and specifically includes the objects in the world, τὰ ἐναύρη, frags. 1 and 2, *DFV*, pp. 239, 240. The phrase is an indication of the new interest in the detail of nature, which began with Empedocles.

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"shut up together" by the force of Harmony. Creation of separate things is thus a harmonizing.⁴

The author does not relate in detail the condition of things before Harmony started to produce individual objects; but he speaks of a sphere with the four elements in it, and a fifth body which he calls "the hull of the sphere" but which he does not further define.⁵ This expression, however, suggests Empedocles' notion of the sphere "bound in the close covering of Harmony";⁶ and it probably signifies the original mass of the world held intact by an all-pervasive and comprehensive force, comparable to Empedocles' sphere with Love thoroughly diffused in it. We shall see later that Philolaus believed that the form of an individual object was a pattern impressed upon a certain quantity of matter, and the object preserved its identity as long as the form held the matter within it. In somewhat the same way, the world is conceived as a content held together by a peripheral casing like the hull of a ship.

3. The expressions and the whole theory of Philolaus leave no room for doubt that the process of creation was regarded as a progressive one, and in this he kept to the original position of his Order. But his own development of the idea of Harmony entailed one curious aberration from the Master's doctrine. Pythagoras, if our surmises were correct, must have held that creation or the separation of the world into parts by the inhalation of air started at the outside of the mass and worked inward. Philolaus, believing that creation was not a separation but a fitting to-

⁴ The Greek verbs are ἀρμόχθῃ, συναρμόχθῃ, συγκεκλείσθαι. In frag. 7, ἀρμυσθέν is equivalent to "created."

⁵ frag. 12, *DFV*, p. 244; for the reading, Gundermann in *Rhein. Mus.*, 1904, p. 145; for the meaning, Burnet, p. 294. One should also notice Aristotle's conception of τῶπος, *Phys.*, IV, 209 b 1-4.

⁶ Emped., frag. 27.

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gether, asserted that the process commenced at the center of the mass and worked outward.⁷ He is no doubt careful to state this position so explicitly just because it signalized his departure from the older philosophy.

This change, however, was made less violent because Philolaus and apparently his followers likewise did not regard it as affecting their fundamental concepts. We get a hint of this when Plato in the *Timaeus* (48 b) makes the Pythagorean assert that the four elements were not the ultimate principles of the world; that, so far from being letters, they were not even syllables in the syntax of the cosmos. And this interpretation is confirmed by the fragments of Philolaus, in which earth, air, fire, and water play but a minor part. We are there told that the world and its objects have been fitted together out of limits and unlimiteds, or limiting and non-limiting things, that each thing in the world must be either a limit, an unlimited, or a combination of the two, and that if everything were unlimited, nothing could be known.⁸ It is then said that number is what makes things knowable; number is subdivided into odd, even, and a mixture of these,⁹ but there is no identification of limit and unlimited with odd and even, and we must suppose that this idea was a later phase of the number doctrine.¹⁰ Indeed, it follows from the passages of Philolaus just summarized that number is to be connected solely with limit, since it is number or limit which makes things knowable.

4. Doubtless it was by means of this idea of number that the author was endeavoring to withstand the prevailing sceptical attitude toward science, and we must try to

⁷ frag. 7, *DFV*, p. 242; frag. 17, *DFV*, p. 246.

⁸ frags. 1, 2, 3, *DFV*, pp. 239, 240.

⁹ frags. 4, 5, *ibid.*

¹⁰ Arist., *Met.*, I, 986 a 17; *Phys.*, III, 203 a 10.

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understand it in order to gain some appreciation of what he meant by limit. In one place he says that you can observe the nature of number not only in divine things but also in human deeds and words, in the handicrafts and in music.¹¹ The last named instance is the only one which he treats of with any degree of fulness, and he does so in order to explain, not number, but musical harmony. However, if we consider his description with the idea of deriving from it some understanding of his conception of number, it appears that numbers are employed to express the intervals between the fixed notes; and we are thus led to the general notion that numbers make things known by giving their measure. Much the same significance may be posited for the application of numbers to the exact handicrafts, of which the author speaks. In architecture, for example, which was in its most flourishing and glorious period in Greece during the lifetime of Philolaus, building plans which expressed ideals of matchless grace involved arithmetical and geometrical formulae, and the actual dressing of the raw material depended upon the observance of numerical specifications. "Numerical laws," says M. Choisy, "determine not only the general disposition of the orders; they are found in every detail of decoration; they regulate even the outline of the mouldings."¹² And the same eminent authority believes that these numerical laws were developed under the guidance of Pythagorean doctrines. Such practices might plausibly yield the notion that what is measurable is knowable and that number, which expresses measurement, makes things known.

If then number in this function is the same as limit,

¹¹ *DFV*, frag. 11, p. 243.

¹² Choisy, *Hist. de l'Arch.*, I, pp. 390, 391, 399.

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we are to understand that a limited thing is knowable because it is mensurable, and we may guess that limit contains the notions of definite size and shape. This supposition is strengthened by what seems to me the only possible and intelligible interpretation of the sole fragment of the author which deals with limits.¹³ Philolaus is attempting to show that the whole world is harmonized out of limits, unlimiteds, and combinations of the two; and he illustrates his thesis by fields of land. "Some of them, being limits, limit; and others, (formed) of limits and unlimiteds, limit and do not limit; while still others, (formed) of unlimiteds, will prove to be unlimited." A more obscure and Pythagorean illustration could scarcely be imagined. But Philolaus must mean peripheral lines by limits here,¹⁴ and a field formed by limits would thus be one marked by regular boundaries. What then would an unlimited field be? It is unlikely that the phrase refers to land actually unlimited in extent, as the size and configuration of Greece and Italy were too well known to permit such an absurdity. Nor do I believe the author was thinking of unsettled countries on the border of civilization, whose boundaries were unknown or indefinite; the Greek words imply used lands.¹⁵ But if one remembers the mountainous nature of Greece and Italy and the large grazing industry in those countries, it will seem quite possible that by "fields of unlimiteds" Philolaus meant mountain pastures which had no regular or fixed boundary lines. Simi-

¹³ frag. 2, *DFV*, p. 240.

¹⁴ Diels translates simply "Linien," *ibid.*

¹⁵ ἐν τοῖς ἐργοῖς, which Diels translates "an den Aekern." The phrase may, however, have an implication of surveying; cf. Xen., *Mem.*, IV, 7, 2, ἐργον ἀποδελξασθαι, where ἐργον must mean "agri mensuram" and Dindorf says: "Cogita agri portionem dividendi inter plures mensura definiendam." If this significance is applied to the words of Philolaus, a limit would be a surveyor's boundary line.

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larly fields formed from limits and unlimiteds would be those whose sides were partly definite and partly undefined where they extended to irregular features of the landscape. On this interpretation, the conception of limit implied regularity of form as well as measurable extent. This duality of meaning will perhaps appear the more natural if we consider the practical difficulties in determining the size of an object with irregular outlines.

5. We are now in a position to put together the two constitutive characteristics of the created world, the four elements on the one hand, and the limiting and unlimited feature on the other. Objects are formed by shutting up together some of the four elemental substances of nature; this combination is the inner reality or essence (*ἐστὼς*) of a thing, and it cannot be known, probably just because the components are so fused that each has no independent form and therefore cannot be measured or calculated. But without this substantive being, nothing can come into existence as a distinct object.¹⁶ Besides its material constitution, each thing has a form, shape, or size, and when this feature of it is reduced to measurement, the thing can be known and distinguished from other things.¹⁷ Not all things have this property, but everything which is known has it; in the words of Philolaus, "all things that are

¹⁶ I have attempted to explain the author's meaning on this point in a note on Philolaus, frag. 6, *Classical Philology* for October 1922.

¹⁷ The appropriateness of this position should not be overlooked. (1) It utilized the Pythagorean interest in mathematics. (2) It was in line with, and a great advance over, the scientific tendencies of the day, especially in the West, with which Philolaus was in touch through his medical associations. (3) It was the strongest refutation of sensationalism and scepticism about natural science, and was employed as such by Plato, *Rep.*, X 602: Soc.—"And the arts of measuring and numbering and weighing come to the rescue of the human understanding—there is the beauty of them—and the apparent greater or less, or more or heavier, no longer have the mastery over us, but give way before calculation and measure and weight?," Glaucon—"Most true." (Trans. Jowett.) cf. *Tim.*, 87 c 4.

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known have number," that is, are capable of numerical specification. It will be seen at once that the limit of a thing is a part of that thing, and this leads us to the discovery that in Philolaus there is no such thing as Limit or Unlimited regarded as ultimate cosmological substances, but only limiting and unlimited things. Philolaus thus used the words and perhaps the general idea of his Master; but what Pythagoras had posited for the world and its celestial bodies, his follower by a clever shift applied to individual objects of nature. Moreover Limit has been transformed, not into limited, but into limiting things; it is as if the form of an object were conceived of as actively restraining its substance, and keeping it within a certain individual contour, while unlimited objects had no such principle in them and were metaphysically dead.

6. This peculiar notion cannot be studied directly in the fragments of the author because nothing is said about it; it is only through the cognate ideas of Number and Harmony that we get any clue to the real meaning of limits. Now the figure of Harmony stands as the creative force in the world, and the verb "harmonize" is used to express the author's specific notion of the action involved in creation.¹⁸ Further light is thrown on the subject by the remarks of Simmias, a Pythagorean and a former disciple of Philolaus, as given in Plato's Dialogue, the *Phaedo*.¹⁹ The question which is being discussed is the nature of soul and its relation to the body. Simmias advances the theory that the body is formed of the four traditional opposites, and that the soul is the principle according to which they

¹⁸ frags. 1, 2, 6, 7, *DFV*, pp. 239-41.

¹⁹ pp. 85 e-86 d.

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are fitted together and harmonized into an entity.²⁰ The physiological side of this doctrine is the same as that ascribed to Philolaus in Menon's *Iatrika*, and in view of the close correspondence between microcosm and macrocosm which runs through all Greek cosmology, we are justified, I believe, in employing Simmias' idea of soul as harmony to explain the Harmony of the world as set forth in the fragments. On this basis, Harmony is the active principle in nature, the law or proportion according to which the four substantial elements are mixed.²¹ It expresses the idea of an active nature, particularizing the world into separate objects by mixing various ultimate elements according to numerical specifications, so that it has become an orderly, regular cosmos. It would exist as soul in human beings, just as in the system of Anaxagoras there were portions of *Nous* in animate objects; and it might thus be called the soul of the world.

Now by the side of this world Harmony, there is in the fragments the figure of Number itself, whose activity can best be seen in the decad, which shows forth its omnipotent and divine regulative force.²² It is this Number which in the soul harmonizes all knowable objects in perception and relates them to one another. The expression "Number harmonizes" would indicate to one who is conversant with the modes of thought and speech of the period that Number is Harmony in one of its functions; and the whole

²⁰ In the doctrine sketched by Simmias, there is no express statement that the soul as harmony was an active principle; but Cebes, the other Pythagorean, has a theory in which the soul is plainly the active causal principle in the body, and this shows that it was at least possible for Pythagoreans to believe in such a principle. The truth is that such theories, as Simmias is made to admit (92 d 1), were only "specious analogies," and they could be developed along inconsistent lines.

²¹ cf. also frag. 6, *DFV*, p. 241, l. 2, where *φύσις* and *ἀρμονία* are used side by side.

²² frag. 11, *DFV*, p. 243.

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phrase taken together with the words of Simmias in the *Phaedo* seems to yield the idea that Number, Harmony, and soul in the system of Philolaus were various aspects of one and the same principle. This then is the human manifestation of that world-principle to which Aristotle alludes, when he says that the Pythagoreans made the whole world harmony and number.²³ It is now easier to understand Philolaus' statement that Number gives bodily existence to things and distinguishes them mentally.²⁴ Number is also Harmony in one of its activities, a function of the prime cause which has given separate corporeal entity to objects by mixing the elements and impressing forms or measurable limits on the mixtures, so that each object can be distinguished from all others. The assignment of this objective power to Number and especially to the decad will not appear unintelligible if we remember the previous interpretation of Pythagoras; indeed it would seem that Philolaus is simply following the traditional doctrine of his Order on this point.²⁵

If, then, Number is an attribute of Harmony and specifically the cause of the distinguishing forms of things, and if furthermore these forms are in fact numerically calculable limits, it must follow that the author meant to ascribe the limiting function to Harmony. We have therefore the cause of motion or creation, in which the principle of Limit inheres, and on the other hand there are the objects of the world, which have their particular limits. Or we can put it in this way: there is the principle of Number, which is one aspect of Harmony, and there are all the particular numbers, which make up the external dis-

²³ *Met.* I, 5, 986 a 3.

²⁴ frag. 11, *DFV*, p. 243, ll. 14, 15.

²⁵ See above, p. 40.

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tinguishing features of things. But since these features were the effects of the principle, which was active, they were also conceived as active; and hence they are described as limiting the objects on which they have been impressed. This will explain why Philolaus does not speak of limited things, but only of things which have limiting outlines. Limit was an active principle and could not properly be used to represent a state of being; the latter was expressed in the statement that things have number. The interesting point to observe here is that, although Philolaus had a comparatively advanced and scientific concept of cause of motion, he had apparently very little idea of the relation between cause and effect, for he portrays the limiting characteristics of objects merely as miniatures of the limiting principle, the implication being that a cause works by dividing and distributing itself.

7. So far as we know, Philolaus did not raise the question, which in somewhat altered form became one of the chief problems of Socrates and Plato, whether the number-limits were parts of things or were separate. Aristotle, who seems to have been badly confused by the different positions taken by various Pythagoreans, says in one place that the numbers were not separate, while in another passage he implies that they were separate.²⁶ Philolaus says simply that knowable things have number. These number-limits are certainly part of any object considered as an entity, indeed they are the constitutive principle in the object. But on the contrary they do not appear to be part of the object's material substance. It would seem therefore that, in this conception of number-limits, we meet with a stage of thought similar to that represented by the *Nous* of Anaxagoras and the *Love* of Empedocles; for all these

²⁶ *Met.*, XIV 3, 1090 a 21; I, 6. 987 b 10.

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ideas rest on the distinction of some active principle from the material things in which it works, and they were obviously attempts to grasp the notion of pure force. But they remained ambiguous simply because the authors could not go all the way to an appreciation of immaterial cause. We might thus say that Philolaus seems to confuse soul or vital principle with material form; and this confusion was not wholly relieved in the Socratic development of the doctrine.

If our account of Philolaus is correct, we must hold that Harmony was a figure similar in many respects to the *Nous* of Anaxagoras. It was not simply corporeal: it was a force which acted on the corporeal elements and was the cause of motion in them. It gave order and regularity to the world by relating and distinguishing its different objects or parts in one intelligible system. It was apparently itself endowed with limiting activity, which was in some sense cognitive, and it certainly had this in its microcosmic existence as soul in human beings. It was therefore psychologically anthropomorphic, like the first principles of other philosophers of this period. It was furthermore, in the form of Number, an omnipotent power, the source and regulator of all life both divine and human.²⁷ It was thus what other thinkers called god, but the Pythagorean on account of his religion probably did not openly apply this term to it.

8. We must now notice briefly the conception of order that is implied in the fragments of Philolaus. It is closely bound up with the notion of Harmony, and indeed its fundamental significance appears to be that each of the various objects of the world gains its entity and its distinguishable attributes by the action of Harmony or Num-

²⁷ Philolaus, frag. 11, *DFV*, p. 243, ll. 4-6.

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ber.²⁸ If we analyze this idea a little further, we seem to find ourselves in the presence of that old supposition, implicit in the first Greek systems of philosophy, that whatever regularity there is in the world must be due to the supremacy of one divine power. But there is in Philolaus no suggestion that the world is generated out of Harmony, for the latter is a force; nor that Harmony exercises its control by means of threatening fiats or restraining commands, such as were the rule in Heraclitus. Nor, finally, does there seem to be any trace of Necessity either practical, in order to preserve a proper balance between the opposites, or religious and mystical. The order of the world is simply the result of creation's being itself a process of harmonizing, and the implication would thus be that objects are harmoniously related to one another because they were all created in the same process and regulated by the same force.²⁹ There is furthermore the suggestion that Harmony in its objective manifestations is always capable of mathematical formulation, and that therefore the relations of things harmonized are susceptible of numerical description.³⁰ This is the idea of order,

²⁸ frag. 6, *DFV*, p. 241, ll. 2-14.

²⁹ In this special sense, it is true to say that Harmony is also Necessity. cf. *Diog. L.*, VIII, 85, RP 67 B.

³⁰ The relation of Unlimiteds to Harmony is a difficult problem. They were certainly not susceptible of numerical description and therefore could not be known scientifically. Yet quite as certainly they entered into the composition of the world, for Philolaus says that the ordered universe is fitted together from limiting and unlimited things. According to frag. 6, the *έστρω* or material substance of both limiting and unlimited things is unknowable and therefore unlimited. Following this hint, we might suppose that unlimiteds were simply substances which had no measurable form, or which had not been completely harmonized. In this case, the action of Harmony would be twofold—fitting limits to pieces of substance, and fitting these limited things together with unlimited portions of substance. Then is the action of Harmony a process which is not yet completed? Philolaus may have treated these points in the lost parts of his book, but on the other hand, all that we know of Pythagoreanism leads us to expect incomplete analogies of this sort.

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I suppose, which underlies the application of harmonic intervals to the celestial bodies.³¹ Indeed this whole concept gives the impression of being founded on mathematical analogy rather than on physical investigation; and this consists with all that we know about the labors of the Order, which were not in any true sense concerned with detailed observation of nature. The notion of order therefore appears, when applied to the world at large, as a metaphysical postulate of regularity rather than a scientific theory of causation.

We should also remember that the harmonious interrelation of things is an epistemological, as well as an ontological circumstance; that is, it exists in cognition and in Nature. "Harmony," says Philolaus, "is a union of things mixed from many parts, and an agreement of variously minded beings."³² We may infer, I think, that this agreement was an attribute of creative Harmony, which was also cognitive; and thus we are brought to the notion that it was the plan or condition under which the world was developed. There is thus latent in it the suggestion that the orderly activity of nature is the expression of the ordered design of the supreme force which regulates the world. In this detail again, Philolaus is comparable to Anaxagoras, and we must believe that they were both thinking under the influence of the new humanistic point of view.

9. Before leaving Philolaus, let us pause to inquire what he thought the relation of man should be to the supreme power of the world. In the *Phaedo* (61 e 7-9), Cebes tells

³¹ In Mr. Burnet's conjecture, pp. 122, 351.

³² frag. 10, *DFV*, p. 242. cf. frag. 11, *ibid.*, p. 243, ll. 8-16, with frag. 6, *ibid.*, p. 241, ll. 9, 10; there is virtually a correspondence between knowledge and Being, which is of course characteristic of Greek philosophy, though it was not expressed in those terms before Plato.

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Socrates he has heard Philolaus say that it is not right for a philosopher to commit suicide; but Cebes professes ignorance of the reason for this idea of his former Master's. These remarks are an historical touch which it does not seem reasonable to suppose Plato would have invented, and we are, I believe, justified in accepting them as evidence that Philolaus did hold it wrong for a seeker after truth to take his own life. But we get no further light from Plato on this Pythagorean belief, as Socrates proceeds to develop his own ideas on the subject; these may well have been Pythagorean in origin,³³ but we cannot be certain about the different elements in the doctrine, as it is presented to us in the dialogue. There is, however, a fragment of Philolaus which gives the old Pythagorean view that the soul has been joined to the body for the purpose of punishment and is, as it were, entombed in the flesh.³⁴ From other sources we know the rest of this doctrine, which is Orphic as well as Pythagorean, and it is not difficult to guess that Philolaus' objection to the suicide of a philosopher was that the latter would thereby interrupt his purification in the flesh, from which he should only be released by god at the proper time. Now this implies that philosophy was purification—the original doctrine of the Order—or, in other words, the supreme task in this life was the quest for knowledge of the principles which govern the world. We are thus brought to the historical point, that Philolaus (and probably his scientific contemporaries in the Order), while dropping the primitive taboo and the weird practices that were characteristic

³³ cf. *Phaed.*, 61 d 9, 10.

³⁴ frag. 14, *DFV*, p. 245. cf. Plato, *Gorg.*, 493 a 8, where the "Italian" may with some plausibility be identified with Philolaus.

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of the earliest Pythagoreanism, still maintained the pure religious mysticism.⁸⁵

10. There is left the question whether the god of religion, to join whom was the goal of the mystic and the end of all earthly purification, was identified in the thought of Philolaus with the supreme force of Number or Harmony, which regulated the physical world and formed the highest concept of philosophy. Now there is nothing specifically on this point in the fragments of Philolaus or in the notices about him, which may be considered authoritative. But we have seen reason to believe that all the other presocratic philosophers, of whose thought on this matter there remains any evidence, held that the god of science was also the god of religion; or at least that there was no other supreme god. We are thus predisposed to believe the same of the Pythagoreans. Moreover there is a good explanation for the absence on any definite information on this point; the Order was a mystical society, similar in this respect to the Orphic fraternities, and its members were bound to preserve silence on the holy secrets to which they were admitted.⁸⁶ But it is entirely unnatural to suppose, as some authorities have done, that these arcana were the scientific theories of the Founder and his followers; and the idea is amply disproved by the open teaching and the published books of later members. What any such mystic brotherhood jealously guarded was its god and its method of reaching him; and we may suppose this was as true of the Pythagoreans as of the initiates in the Eleusinian

⁸⁵ cf. Burnet, p. 321. In *Gk. Phil.*, p. 87, the same author maintains that "the religious side" of Pythagoreanism was dropped. This seems much too broad a statement. Mr. Burnet does not accept the fragments of Philolaus, but even so, the remarks of Cebes and of Socrates in the *Phaedo* show that Philolaus had kept some of the original religious doctrine of purification.

⁸⁶ cf. Aristoxenus, *ap. Diog. L.*, VIII, 15 RP 55 A; Porphy., *Vit. Pyth.*, 19.

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rites, for example. Only the Pythagorean method of reaching god by means of philosophical study, involving as it did no temporary withdrawals from ordinary existence and no intricate ceremonies, but consisting rather of a whole life of devotion, was not a secret and could hardly have been rendered one. And moreover the scientific and cosmological doctrines of the School were incapable of elucidation, as we have seen in the case of Philolaus, without reference to a supreme physical power, which in pre-socratic thought was universally held to be god. So that on the philosophical side, even the Pythagorean god came to be known outside the Order, though that apparently did not take place until after the death of the Founder; and therefore it was only the religious god that remained always a secret possession of the members of the society.

Now there is one circumstance which in my view makes it probable that this religious god was the same figure essentially as the cosmological source of motion. From the very beginning, the Pythagoreans devoted themselves to scientific and cosmological inquiry, and we have been led to believe that they regarded this as a means of purification, which would eventually bring them to god. What was the reason or the fancy which prompted them to think that the study of nature could serve as a method of reaching the god whom they adored? or, in other words, how could a philosophico-scientific occupation be utilized for a religious purpose? I can imagine no satisfactory answer to this question unless it be that such inquiry was regarded as necessitating acquaintance with the laws by which their religious god regulated the world. If cosmological speculation was in reality a way of knowing the god whom they worshipped in secret, they might with reason devote a whole life to the contemplation and investigation of his

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works. But there would not be the slightest use in considering nature's god, if he were not at the same time the divinity for whom they undertook their purification. I believe therefore that the whole notion of philosophical purification with all its allied doctrines must finally rest on the concept of a prime mover who was also the supreme religious figure. For this reason it is possible to accept some of the fragments of Philolaus that have appeared doubtful or spurious, and particularly the reference to a god who is "guide and ruler of all, one, eternal, single, immovable, like himself and different from all else."³⁷

³⁷ *DFV*, p. 247. The reference of these attributes to the number Seven may be an inference of Lydus or original with Philolaus.

CHAPTER X

SOCRATES

1. "THE Sophists and Socrates." "Socrates and Plato." Such were typical captions under which one of the greatest teachers and thinkers of the world received treatment in the older histories of philosophy. Of late we have come to believe that his life and work cannot be adequately appreciated by representing him chiefly as a contemporary of the Sophists or the antecedent of Plato. He was both, to be sure; but his points of similarity with the Sophists yield no more than the fundamental humanistic point of view from which they all started, and his relation to Plato may serve to explain the pupil but not the master.

There is still, and there always will be, the problem as to how much of Plato is Socrates; but Zeller and more recent scholars have accomplished much in disengaging the two personalities and making the son of Sophroniscus a man of flesh and blood—and gray matter. There is also the problem of reconciling the full-length portraits of Socrates, drawn by Xenophon and Plato, the comic sketch by Aristophanes, and the torso by Aristotle, with one another. It cannot be asserted that permanent progress has been made on this point, although it seems likely. Recent critiques of Xenophon's historical reliability in his Socratic works have tended to his disparagement. Professor Burnet leads the van of those who hold that the Platonic Socrates, as delineated in the early Dialogues, was essentially the

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real one. This method, however, involves a determination of the historical order of the Dialogues and the extent of Socratic influence in them; and on both these points there is difference of opinion in the party. The extraordinary complexity of the whole problem naturally leads to extreme views, two of which deserve mention. One is a development of Professor Burnet's view to the conclusion that all of the Dialogues of Plato are Socratic, with the implication that Plato's own doctrines were developed orally within the Academy and found expression only in the references of his pupils. The other view is that the pictures of Socrates given by Aristophanes, Xenophon, and Plato, are all literary fictions, so that we really know nothing about the historical Socrates.

Space forbids that I should do more than state in a summary fashion the method I propose to follow, but that much at least is necessary. I have no new theory to propound, and my views can lay claim at most to common sense, in whose name many serene stupidities are perpetrated. I shall merely attempt to utilize all the information given by Aristophanes, Xenophon, Plato and Aristotle, but make an allowance in each case for the special circumstances which influenced these writers respectively. The comedian was obviously composing a caricature, which may be described as an exaggerated or distorted fact. The fact which Aristophanes caricatured was philosophy, which had lately taken root in Athens in the persons of certain cosmologists, Sophists, and Socrates; and the picture that he draws is a jumble of their doctrines and practices, but so far as it represents Socrates at all, it is the Socrates of 423 B.C. and not of 399 B.C. Xenophon's *Memorabilia* was written some time after Socrates died, with the purpose of justifying Socrates against the charge

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of irreligion; and the statements of the author in support of this thesis must be examined with care on the ground that they represent a subjective interpretation made under a strong prejudice. Furthermore this author's writings are of very unequal value, and even in those which appear most historical, grave inaccuracies have been noted. Although he left Athens about three years before Socrates was put to death, he had known Socrates personally; but he probably had little purely philosophical interest then. Obviously Plato had better opportunities for knowing Socrates than any other of these writers, and he also was possessed of a far deeper philosophic acumen than Xenophon. At the same time, like Xenophon, he wrote under a strong prejudice. Furthermore in the period when he seems to have been mainly occupied with the delineation of Socrates, he was developing a consummate literary and dramatic art; that art was no doubt a realistic one, but it was art none the less, and the genius that exercised it was not the genius of an historian. Aristotle never knew Socrates and did not come to Athens until more than thirty years after Socrates died, so that his information is second-hand. Furthermore he was not interested in Socrates the man, but in Socrates the philosopher, and his statements are metaphysical interpretations of Socratic views. So much premised, we shall proceed to use the evidence from these four sources as intelligently as possible.

2. The main features of Socrates' life may be briefly told. He was born at Athens about 470 B.C., and his family were probably statuaries. He married a woman named Xanthippe, by whom he had three sons, and who is portrayed by later writers as a shrew. He was of an odd appearance, with a snub nose, protruding eyes, and a shambling gait. From boyhood he manifested psychic

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peculiarities; he claimed to hear an inner voice, which he regarded as a divine sign to guide his actions, and he was also subject to fits of abstraction, so that he would stand for hours, lost in thought and completely insensible to what went on around him. But these characteristics did not prevent him from serving as a soldier and fighting with great bravery.

He must have become interested in philosophy when he was quite young, and is said to have studied under Archelaus, the first native Athenian philosopher. He soon gained a reputation for his learning, and gathered about him a group of younger enthusiasts. All this must have occurred before 423 B.C., when the comic poet Aristophanes produced the play called the *Clouds*, in which Socrates appears as the head of a School. One of his pupils had the temerity to ask the Delphic Oracle whether there was anyone wiser than Socrates, and the priestess replied in the negative. This response was treated by Socrates with typical humor and self-depreciation—a strain of character which gained him a reputation for irony—and he maintained that what the oracle meant was that he knew he did not know anything, while other people, professing wisdom, skill, or expertness, were fundamentally ignorant. The subjects on which he found even the most respected of his fellow-citizens ignorant were mainly such as concerned the meaning of human life as a whole and in its various organized activities; and his appreciation of this situation—a city whose leaders were ignorantly opinionated on the most vital questions—led him to devote the remainder of his life to a mission, which he humorously described as convincing people of their ignorance, but which he thought of seriously as urging people to care for their souls.

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The years of his mission, and indeed the last thirty years of his life, fell within the period of the Peloponnesian War, when Athens was fighting for her existence. Towards the close of this difficult time, when it became apparent that Athens was losing in the struggle and revolutions took place in the city, Socrates, by his independence and his refusal to adopt what he considered unjust methods, offended both the democratic and the aristocratic parties. In 399 B.C., shortly after the close of the war, Socrates was accused of impiety, on the ground that he did not worship the city's gods but introduced new divinities, and that he corrupted the youth. He was convicted and condemned to death. It would have been easy for him to escape from prison, where he was forced to wait for some time; but this he steadfastly refused to do, and he died according to his sentence, by drinking poison.

3. In considering his philosophy, we must first note that one effect of treating him by himself, independently of the Sophists and Plato, has been to emphasize his connection with cosmology. It is not to be supposed that this connection alone will account for his thought; but certainly no man's consciousness can be completely abstracted from the influences of early environment, and probably thoughts, like persons, have ancestors as well as relations. What we call cosmology was the philosophy of the period when Socrates was a youth; and if we are to understand him, it will not do to limit our investigation to the finished product of his thought, if such there was. We must take into consideration the continuity of the culture to which he belonged. Here lies the trouble with the usual treatment of Socrates and his period; the new point of view, the new problems and methods which were characteristic of the age or were peculiar to him, have been stressed to such a

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degree that an impassable chasm has been formed between him and all that went before. It is as if the presocratic age laid down its tools forever on a Saturday evening, and on the following Monday morning an entirely different group of artisans with brand new implements commenced work. And yet such a view is frequently implied by historians of philosophy.

On the other hand, let us recall that in Socrates' youth Parmenides was still teaching, and that on one occasion at least Socrates conversed with the founder of the Eleatic school.¹ Moreover Empedocles, Anaxagoras, Zeno, Melissus, and Archelaus were all influencing Greek thought after Socrates was twenty years old, and it is impossible to believe that they did not influence Socrates. Finally, we have acceptable evidence that he was for a time the disciple of Archelaus.²

Furthermore, the testimony of Plato, Xenophon, and Aristophanes indicates that Socrates, as a young man especially, was interested in the problems of cosmology—the same problems that were dealt with by the philosophers mentioned in the preceding paragraph.³ In the *Clouds*, he is represented as dealing both with natural science and with sophistic argumentation;⁴ and I cannot see how the play would have had any point unless this basis of it was true. It is important, however, to remember that it was put on the stage in 423 B.C., that is, over twenty years before Socrates' death, and it therefore portrays the philosopher

¹ Plato, *Parm.*, 127 b. The historicity of this meeting is maintained by E. Meyer, *Gesch. d. Alt.*, IV, § 509 n., and Burnet, p. 192, n. 3.

² Ion of Chios, frag. 73 Köpke; Theo., *Phys. Op.*, frag. 4, *ap. Simpl. Phys.* 27, 23 *DFV*, pp. 323, 324.

³ For the main Argument of this paragraph I am indebted to Burnet *Gk. Phil.* I, pp. 144-50.

⁴ τὰ κατὰ γῆς l. 188, τὰ μετέωρα l. 228, τὰ θεία πράγματα l. 250; cf. τὰ θεία Xen., *Mem.*, I, 1, 15, and τὰ περὶ τὸν οὐρανὸν τε καὶ τὴν γῆν πάθη *Phaedo*, 96 b 9.

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in his middle age or youth.⁵ Xenophon on the contrary was concerned with the Socrates who was condemned and put to death, and he professes to argue that Socrates was actually opposed to natural science. Yet he twice admits that his Master was conversant with the problems of natural science,⁶ and he makes other statements which support this admission. Now it is quite true, if we accept the evidence of Plato's Dialogues, that Socrates in his maturity did not busy himself with natural science;⁷ but there is no evidence other than Xenophon to prove that he was opposed to it, and Xenophon contradicts himself. Making allowance then for the overstatement of Xenophon, we could argue from the *Clouds* and the *Memorabilia* that Socrates in his youth and early manhood was interested in the traditional subjects of natural science, but that he afterward turned his attention away from this department of knowledge and busied himself with problems which he believed more nearly affected human beings. Now this is precisely the course which Socrates in the *Phaedo* (96 a) says that he followed, and the list of subjects which he there enumerates as having occupied his early manhood corresponds exactly to the main topics of cosmological discussion in that period.⁸

⁵ There is no reason to suppose that Socrates was especially noticeable, except for personal oddities, while he was engaged in his cosmological studies; he became a marked man when he adopted his new method. But it was as an outstanding figure that the art of Aristophanes could use him. Hence he had probably turned away from cosmology when the dramatist ridiculed him for it.

⁶ *Mem.* IV, 7, 3 and 5.

⁷ Confirmed by Arist., *Met.*, I, 6. 987 b 1, 2.

⁸ See Burnet's edition of the *Phaedo*, notes *ad loc.*—The evidence would lead us to mark two periods in Socrates' intellectual development, the first beginning when he was quite young (*πρὸς ὧν*, *Phaed.*, 96 a 7) and devoted to science, the second when he took up his method of *λόγοι*. But the second period is subdivided by the response of the oracle at Delphi. We may therefore best consider his thought as developing through three stages: (1) physical investigation, (2) the theory of "forms" and the new method of

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Now it is true that Socrates' λόγοι always concerned problems that were at least on the surface practical; that is to say, the inquiries of his mature years were restricted to questions of immediate human import and did not embrace natural science. It is a matter of considerable consequence to understand the reason for this change of interest. Professor Adamson has maintained that "there is no evidence entitling us to connect the restriction of the Socratic method with any view on the part of Socrates regarding the failure of previous speculative philosophy."⁹ Xenophon, however, says in one place that Socrates used to wonder why the physical scientists had never appreciated the impossibility of discovering how the world came into being and by what necessary laws it was governed.¹⁰ And Plato in the *Phaedo* makes it plain that Socrates was thoroughly dissatisfied with the results of cosmology when he turned away from it. In order to appreciate this position, it is necessary to recall the end which cosmology had set for itself and the methods which had been developed in order to reach that end. The pre-socratic natural scientists had assumed no less a task than discovering the ultimate nature of the physical world, and in doing this they had, especially since Empedocles, been instrumental in creating truly scientific methods of investigation. But the very appreciation of scientific inquiry was bound to discredit all effort to use it for non-scientific purposes, such as the undemonstrable theories of a prime

investigation, (3) his mission to his fellow-citizens, in which he was chiefly concerned with virtue. Archer-Hind's three divisions (*The Phaedo of Plato*, p. 89, n. 2) appear to rest on a mistaken interpretation of ἀ καὶ πρότερον σαφῶς ἠπιστάμην (96 c 2), which I do not believe refer to a period previous to the physical investigation, but to the apparently satisfactory results at first reached in that investigation.

⁹ *The Development of Greek Philosophy*, p. 75; cf. Archer-Hind, *op. cit.*, p. 86, n. 9.

¹⁰ *Mem.*, I, 1, 13.

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substance. It was evident that if science was to be science, it must stick to facts and become various sciences; and with such sciences Socrates had no quarrel, as Xenophon expressly says.¹¹ The failure, then, which turned Socrates away from the previous speculation, was the quite obvious fact that it had attempted to be a metaphysic while remaining a science, and, as a metaphysic, it had become a patchwork of conflicting guesses.

But both Xenophon and Plato also attribute to their Master a conviction that the traditional cosmology was useless and of no concern to men. The former author describes Socrates as asking why people engage in this study; do they do it because they think they can thereby utilize the forces of nature or merely because they wish to have the knowledge? Socrates himself, says Xenophon, was interested only in the knowledge which would make men good gentlemen and citizens.¹² Plato has him take the same position in the *Phaedrus* (229 e), where he remarks: "To be inquisitive about that which is not my concern, while I am still ignorant of my own self, would be ridiculous."¹³ Now if we remember that cosmological speculation had been based, in the minds of its authors at least, on its practical or ethical use, that in fact it was supposed to determine their actions and their attitude toward the divine powers, in short their religion, then certainly Socrates' condemnation of it as useless will appear startling and unprecedented.

But let us recall the intellectual tendencies of the period. During Socrates' earlier life, while he was still en-

¹¹ *ibid.*, IV, 7, 2-7.

¹² *Mem.*, I, 1, 15 and 16, cf. IV, 2, 24.

¹³ cf. also *Phaedr.*, 230 d 3: "I am a lover of knowledge, and the country and the trees will not teach me anything, while men who live in the city will."

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gaged in physical inquiry, there had been a growing interest in the nature and works of human beings. The scientific study of physiological and psychological subjects, as well as dialectical argumentation, which seemed inevitably to involve the question of truth and knowledge, were signs of the time. These young studies got room to develop in the breakdown of the older cosmology, and they received a tremendous impetus from the feverish political activity of the Periclean democracy, which was essentially a humanistic movement. Moreover, in all this thought about human activity, man was considered by himself and not as a mere material part of the universe; and thus really for the first time in Greek reflection was man fully differentiated from the rest of the world, as a moral, political, and intellectual being. It was therefore possible to investigate mankind quite apart from physical nature, and a demarcation could be made between those studies that dealt with the one and those that considered the other. Hence that general rule which held good for the earlier reflective thought, that there were no categories separating knowledge into departments of religion, physics, and the like,¹⁴ now no longer was valid; for Socrates consciously set on one side all those scientific studies which dealt with nature, and devoted his energy to the new humanistic subjects. Furthermore, in this separation of man and nature, it was obviously impossible to investigate man by means of nature; so that when Socrates called the traditional cosmology useless, he meant that it would not explain man or tell him how to live, as the previous philosophers had maintained.

Yet in a fundamental sense the aim of Socrates was the same as that of the presocratic thinkers, for he, like them,

¹⁴ See above, p. 5.

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was searching for the ultimate nature of the world in order that men might know the meaning of their lives. The end of his philosophy, like the end of their cosmology, was essentially an ethical one: right living, based on correct understanding. In his conversation with Aristodemus, as reported by Xenophon, he argues that there are gods who rule the world wisely and that virtue depends on man's recognition of these gods.¹⁵ And in the *Republic*, Socrates says that philosophy, tempered with music, is the only savior of virtue throughout life and the only guide to a wise choice in the next world;¹⁶ to obtain such knowledge, a philosopher will be willing even to practise death in life.¹⁷ Philosophy, therefore, as Socrates thought of it, was to fulfil the same ethical and religious function which the previous cosmology had attempted.

Nor was this philosophy so radically different in the ostensible object of its investigations, from the earlier natural science, as Socrates sometimes suggested. The object of the latter had been a cause or force which in some way could be used to explain the creation and present operation of the world. Now in the autobiographical section of the *Phaedo*, Socrates, after describing his impatience with natural science, declares that he is still trying to find the cause of things' being as they are.¹⁸ In other words, the object of Socrates' investigations was still a cause which operated in the physical world.

4. The course of previous inquiry into nature had led to the assumption of a succession of first causes which became more and more removed from the sensible world as the series of attempts to explain it lengthened. The last three

¹⁵ *Mem.*, I, 4.

¹⁶ *Rep.*, VIII, 549 b; X, 618.

¹⁷ *Phaedo*, 64 a-67 b.

¹⁸ cf. *ibid.*, 97 b 2-7 with 99 c 6-d 2.

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of these systems, those of Empedocles, Anaxagoras, and Philolaus, had erected as their final postulates the figures of Love, Mind, and Harmony, whose causal effectiveness in no way depended on their materiality and whose very names suggested an insensible nature. The Pythagorean especially had gone to great lengths in getting away from perceivable objects; he had not only taken the general concept of Harmony as his first cause but also, led by the mathematical studies of his Order, he had developed a theory of knowledge, which involved the idea of measurable forms of objects. He never went so far as to assert that such a form was not part of the material object to which it belonged, but nevertheless the very notion of form was so inherently abstract that it tended to divert attention from the obviously material qualities; and furthermore in the active power which he apparently attributed to forms, they seemed to belong to a different order of existence from the inert elements on which they worked. Now Socrates, as we have seen, was conversant with the systems of earlier Greek inquirers, and it appears that there was some very close relationship between him and the Pythagoreans. He numbered among his most earnest pupils several members of the Order (Simmias, Cebes, and Phaedondas), who had previously sat under their own master, Philolaus, in Thebes;¹⁹ and Echebrates and the Pythagoreans at Phlius are represented by Plato as deeply interested not only in the personal circumstances of Socrates but also in his teachings.²⁰ Nor was this interest merely on the side of the Pythagoreans, for Socrates was well enough acquainted with the doctrine of Philolaus to be able to explain a phase of it to his former students;²¹

¹⁹ Xen., *Mem.*, I, 2, 48; III, 11, 17; Plat., *Phaedo*, 59 c 1.

²⁰ *Phaedo*, 57 a-59 c; 102 a.

²¹ *ibid.*, 61 d.

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and the resemblance of many of Socrates' views to those known as Pythagorean is admitted on all sides. One of these points of similarity is the subject with which we are now engaged, namely, the doctrine of forms. In the *Phaedo* we find Socrates maintaining that there are intelligible forms, apprehended only by thought, to which particular objects of sense approximate in their various qualities; there is, for example, the form or idea of Beauty, in which beautiful things share so far as they are beautiful. The forms mentioned here are those of qualities, such as goodness, beauty, equality.²² Now it is possible that some of the Pythagoreans contemporary with Philolaus had adapted his doctrine of measurable forms so as to apply it to moral and esthetic qualities. Aristotle said that the Pythagoreans had given numbers to a few such abstractions as opportunity, marriage, justice;²³ but it seems to me most likely that this, as well as the doctrine that things are numbers, was the work of Eurytus, Philolaus' disciple, who gave numbers to all sorts of things and appears to have carried the number-theory to absurd extravagances of analogy. We should accordingly say that the Pythagoreans of Socrates' time had got as far as positing measurable forms of natural objects, by which those objects were known.²⁴ We now find Socrates positing forms of moral and esthetic qualities, which are apprehended only by the intellect. Philolaus did not say that his forms were material, but the implication is that they were; Socrates, so far as I can find, never ascribed immateriality to his forms,

²² In the *Republic*, Socrates posits forms of inanimate objects, such as a bed (X, 596); even this, however, is an artificial thing, made by man, and I know of no evidence that Socrates ever assumed the form of a natural object. Furthermore it is doubtful whether we can refer even the idea of bed to Socrates, because I believe the *Republic* is more Plato than Socrates.

²³ *Met.*, XIII, 1078 b 23.

²⁴ cf. above, pp. 139 ff.

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but he implied it.²⁵ The truth seems to be that the question of substance was latent in both these authors, but that the mind of Socrates had at least grasped the idea of the incorporeal and could work with it. The great and explicit difference between him and Philolaus lay in the fact that the Pythagorean form was a particular, changing with its object, while the Socratic form was a universal which remained the same all through the alterations of the objects which shared it. The originality of Socrates at this point is found in his creative expression of general forms, by which he enriched philosophy with the addition of a whole new world of data, whose nature even he but imperfectly realized.

Furthermore, Philolaus, in order to combat the prevalent sceptical attitude, had worked out a theory of knowledge, which maintained virtually that knowledge depended on measurement and related to the forms; but this could not be applied to universal (immaterial) forms, so that Socrates kept it for objects of sense,²⁶ and went on to develop a new theory of intellectual knowledge of universal forms. To this end, he made a clear distinction between sensation and thought, though that distinction again had been implied by most of the previous philosophers who had been interested in psychological matters. Finally, we must notice the significant fact that Socrates was following Philolaus in ascribing causal force to the forms. The latter author held that each particular form had an active power which made and kept the object what it was; and we surmised that this individual power was derived from the world-regulative energy of Harmony.

²⁵ Socrates kept alongside of his moral and esthetic forms the Philolaic notion of physical shape. Thus in *Meno*, 76 a 6, using the words of Philolaus, he defines the shape of an object as "the limit of solid."

²⁶ *Rep.*, X, 602.

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Now it is worthy of note that Socrates in the *Phaedo*, after expressing his dissatisfaction with previous attempts to find causes, and avowing his own intention of searching for them in a new way, proceeds to develop his theory of forms.²⁷ We are therefore to suppose that this theory was in some way a theory of causation also. The form of Beauty, by its partial presence in objective things, causes them to be beautiful; and in general, every form is in this way a cause.²⁸ This is as far as Socrates gets in the *Phaedo*, and he therefore ends with a multitude of universal forms or causes disconnected with one another in their pure state; they meet only in their partial incarnation in material things. The net result, therefore, of Socrates' inquiry on this point is the conception of causes that work directly on sensible objects. Obviously, these causes were by no means mere subjective creations of the mind, but rather the most real of existing things; yet they were plainly and frankly given a universal and intelligible nature, as contrasted with the particulars of sense. They thus formed a new class of things, belonging to a different order of existence from the world of changing individuals and more real than the latter.

5. Let us now turn to a consideration of the nature of causal activity. In the *Phaedo*, Socrates sums up the efforts of previous thinkers with the statement that they were looking for the physical conditions which determined activity, while he is interested in the end toward which any action is directed. In general, the object of his search is the force which disposes and constrains things in the best possible way.²⁹ This conception apparently applies to each Form in its relation to the particulars of sense; we

²⁷ *Phaedo*, 100 b 3-8.

²⁸ *ibid.*, 100 c 6 and d 8.

²⁹ *ibid.*, 99 c 1.

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are given to understand, for example, that when the Form of Beauty itself makes a thing beautiful, it does so because it is best.³⁰ It follows that Socrates conceived the only true causal activity to be that which is directed toward some end, and it seems plain that he reached this position from a consideration of human conduct. Let us compare two illustrations which he himself gives us. When he is expressing his dissatisfaction with previous natural scientists, he says that if you should ask one of these gentlemen why Socrates is sitting here in prison, he would produce a long rigmarole about bones and muscles and joints; whereas the real reason was that Socrates thought it right to remain. Later he remarks that he cannot understand why such physical conditions as color or form make an object beautiful, since only Beauty can make anything beautiful. In both these instances, the physical conditions of a phenomenon are contrasted with what Socrates proclaims to be the true cause of its being; but this true cause is in one case a conscious human purpose, in the other a Form. This suggests that a Form was also a teleological cause, and it is at least possible that Socrates thought of his Forms as endowed with some sort of consciousness.

I do not believe that any thinker, no matter how unsystematic, could possibly rest content with such a position—a plurality of unrelated causes. It is therefore tempting to utilize the conception of the Good, as found in the sixth Book of the *Republic*, to unify and head up, as it were, the whole scheme of causation; but I do not believe we are justified in attributing to Socrates the philosophy of the *Republic*. This work no doubt forms a transition from the essentially Socratic to the essentially Platonic Dialogues,

³⁰ *Phaedo*, 99 a 4-d 1 with 100 c 9-d 8.

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as the style indicates;³¹ but the systematization that is found here must, in my opinion, be due to Plato. Plato himself was not a systematic philosopher in the German sense, as is shown by the lack of connection between his Dialogues; but he was systematic enough to reduce his thoughts to written expression, and in the case of the *Republic* and the *Laws* especially, the expression was a pretty comprehensive philosophy. On the other hand, Socrates never wrote anything but was always satisfied to develop his thoughts one by one in conversation. For this reason alone, the *Republic* appears to me fundamentally Platonic. Furthermore, certain positions are taken in this Dialogue, which it would have been very difficult for the historical Socrates to maintain. For example, when the Guardians have finished their education, they are to be made to go back into the life of the state periodically and hold public office by turns; but Socrates steadfastly refused to hold office (something quite different from his "mission") and it would have been unnatural for him to make such a provision. Again, the emphasis on the sciences in the higher education of the Guardians is strikingly inconsistent with the position of Socrates. Hence, for what we might call stylistic, schematic, and philosophical reasons, I believe the *Republic* represents Plato rather than Socrates.

But particular ideas in the book may well be originally Socratic, or only slight developments of Socratic theses; and I presume that this is the case with the Good. It is, as I have already remarked, hardly conceivable that Socrates should have ended his thought on causation with a plurality of unrelated causes; and his whole conception

³¹ e.g. the presence of both $\tau\omega\delta\upsilon\tau\iota$, used exclusively in the earlier group, and of $\delta\upsilon\tau\omega\varsigma$, which gradually replaced it. The subject has been exhaustively treated by Lewis Campbell and by Lutoslawski.

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of Forms, as involving a teleological explanation, would make us expect some supreme end or good toward which all the world was directed. Furthermore, in his conversation with Euthydemus as recorded in the *Memorabilia* (IV, 3), Socrates propounds what is really an anthropocentric teleology, in the course of which he mentions "the other gods" and "Him who orders and holds together the whole cosmos" yet is invisible. Now Xenophon claims to have been present at this conversation, and he definitely attributes to Socrates the belief in a supreme god who is good and who directs the world for the best. If then the Forms are causes, it is only natural to suppose that they are inferior causes, working under the control of the supreme cause, who is $\acute{o} \theta e\acute{o}s$, just as the other gods and demons do; they would thus form part of the divine principle ($\tau\acute{o} \delta a\iota\mu\acute{o}\nu\iota\omicron\nu$). That Socrates "hinted at the ultimate unity of all the forms in the Good," as Professor Burnet holds,³² seems to me most probable; but I would go further and say that he also probably thought of the Good as in some way combined with the divine purpose which rules the world.³³

If such an interpretation is allowed, it is possible to gauge the similarity between Socrates and the Pythagoreans. The Good, as the supreme cause which arranges and ordains all things, is Socrates' development of Harmony, as we found it in Philolaus. But whereas in the Pythagorean, the principle is merely the general conception of cosmic orderliness, in Socrates this is extended by the addition of the moral idea of human goodness. The Socratic notion comprehends the Pythagorean, because to

³² *Gk. Phil.*, p. 169.

³³ The language of the *Republic*, 505 d *sqq.*, has led some interpreters to identify the Good with god; this is quite certainly wrong for Plato, as the *Timaeus* shows, but there is no reason why it may not be true for Socrates.

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the Greeks a good or goodness always involved a perfect relation between a subject or cause and an object, effect, or activity; and, in the *Gorgias*, Socrates asserts that human goodness is due to *τάξις* and *κόσμος* in the soul.³⁴ The Good is more than this, simply because it contains a purpose. In the second place, no greater evidence of Socrates' indebtedness to Philolaus and the Pythagorean philosophy can be found than the fact that he kept the Forms as physical causes, and believed that, as such, they somehow entered into the composition of physical objects. But whereas in the Philolaic doctrine each object had one form which made it what it was, Socrates' Forms were universals, many of which were partially present in every object. Hence insofar as the Forms were universals, they became a different kind of thing from the objects of sense.

6. No doubt there were many gaps in the philosophy of Socrates; but is that not what we should expect in a thinker of his peculiarities? Great as he was as a thinker, he was greatest as a teacher; and he never took pains to crystallize his thoughts in formal, systematic, and comprehensive expression. Yet there is one inconsistency in his doctrine which we cannot overlook, if only because it is fundamental to his position in Greek philosophy. The theory of Forms was not meant as a mere logical formula but as a general explanation of causation in the world. It was by participation in the Forms that physical objects came into being. And yet the whole theory was formed solely from the human point of view. The Forms as causes were primarily human reasons; as objects of knowledge, they were primarily human concepts. And the coming into being and ceasing to be of physical objects was the coming and going in those objects of qualities which were in their

³⁴ *Gorg.*, 504 b-d; cf. *Rep.*, IV, 443 d.

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separate individuality teleological mental abstractions.³⁵ Socrates discarded the natural science of his time and devoted himself to a study of men; and then, having made his formula from the activities of men, he extended it to all nature. He made a useful distinction between humanity and nature only to obliterate it, by throwing out into the latter the principles which he had observed in the former. He thus attempted to explain the natural world without any scientific investigation of it, and in this respect his inquiry falls into the sharpest contrast with that of Empedocles. The cosmologist had attempted to develop a truly scientific investigation of nature by building up theory on experiment and observation; but Socrates argued to the ultimate reality of the world and was therefore frankly a metaphysician.

7. This brings us to an examination of Socrates' logical method, which may be considered, besides his doctrine of Forms, as a second great contribution to philosophy. It was obviously impossible to investigate the Forms in their universal aspect by sense experience, and it therefore became necessary to deal with them by pure thought. But the later Eleatics and many of the Sophists had abundantly and with discouraging thoroughness demonstrated the extreme fallibility of the human mind amid objects far removed from the evidence of the senses. Only on one department of knowledge had the activity of these men failed to throw doubt, and that was the science of mathematics, as it existed at the time in the disciplines of arithmetic, geometry, and harmonics. Now the Pythagoreans, who were especially devoted to these subjects, had appar-

³⁵ By "teleological" here, I mean what James suggests when he says: "The essence of a thing is that one of its properties which is so *important* for my interests that in comparison with it I may neglect the rest." (*Psychology*, Briefer Course, p. 357.)

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ently believed that the epistemological foundations of the mathematical sciences could not be shaken because of their exactness; they depended on measurement of one kind or another, and measurement admitted of no dispute. Hence Philolaus, in attempting to meet the sceptical attack, had developed this notion of exact measurement into a general criterion of all knowledge. But Socrates seems to have understood that geometry, for instance, had withstood the hostile approaches of the sceptic, not because it was a matter of exactness (for the triangle of the geometer was in reality not an object of physical experience at all),³⁶ but because it dealt only with objects which were defined before they were handled and therefore had to be handled in accordance with the definition. This being so, it would be possible to treat any subject with similar certitude by first defining it and then experimenting with it within the limits of the prescribed formula. Accordingly Socrates proceeded to apply this method in his inquiries, and it is to this that Aristotle refers, when he says that two things may fairly be attributed to Socrates: universal definitions and inductive reasoning.³⁷

This well-known phrase has been the occasion of so much misunderstanding that it will be well to clarify its meaning in detail by a more extended examination of it and of Socrates' methods so far as they can be abstracted. But it should first be noted that in reality the universal definitions and the inductive reasoning, of which Aristotle speaks, are not to be considered as two separate things, but rather as different phases or even parts of the same logical process; and it would be well to understand the expression

³⁶ cf. *Phaedo*, 65 d.

³⁷ *Met.* XIII, 4, 1078 b 23; cf. *De Part. An.*, I, 1, 642 a 26; Xenophon, *Mem.*, IV, 6, 13-15.

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as signifying universal definitions by means of arguments of an inductive nature.

(1) Socrates' arguments were directed toward establishing real definitions; that is, the conclusions which he sought were not formal propositions in the style "All *M* is *P*," mere proofs that certain instances are subsumed under a general type or that every specimen is included in the species. They always ended in fixing the precise meaning of an existing thing. For instance, Socrates objects to Meno's saying that courage is virtue and discretion and cleverness and magnificence and so forth; what he wants is the one ultimate essence of the virtue.³⁸ To use the phraseology of Aristotle, Socrates was not seeking τὰ μέρη but τὸ τί ἐστιν of the quality.

(2) The process of establishing the definition was of an inductive nature; but Aristotle did not mean to imply that Socrates employed true induction, which, Aristotle held, demanded complete enumeration of the particulars.³⁹ Socrates' procedure was like that of induction in that it "brought up" concrete instances or examples of a universal quality.⁴⁰

(3) Socrates used a particular to get out of it the precise meaning of the general as applied to it. Aristotle gives an illustration of this process in determining the meaning of μεγαλοψυχία, though he neither attributes it to Socrates nor describes it as induction.⁴¹ The particulars are instances of a type, and we define the type by establishing its significance in the particulars. Hence it is possible that one instance, if properly analyzed, could bring us to the

³⁸ *Meno*, 74 a 4-10. cf. *Euthyphro*, 6 d.

³⁹ *Anal. Prior.*, II, 23, 3: ἡ γὰρ ἐπαγωγή διὰ πάντων.

⁴⁰ On the meaning of ἐπαγωγή and its cognates, see Bonitz, *Index Arist.*, s.v.; Joseph, *Introd. to Logic*, p. 350; A. Busse, *Sokrates*, p. 141.

⁴¹ *Anal. Post.*, II, 13, 18.

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definition of the quality; but ordinarily either it is easier to recognize the quality by comparing several different manifestations of it, or a second and third manifestation will test and supplement the definition gained from the first.

(4) In analyzing a particular instance, we may be said to "recognize" the general quality in it.⁴² Aristotle bases this doctrine on the argument of the *Meno* that knowledge is reminiscence, and so he associates it with the name of Socrates. Thus the inductive process of definition rests finally on a factual intuition, the recognition of a universal of which we have had previous knowledge, though we may never have had knowledge of the particulars in which the universal is found.

(5) After we recognize the universal, we proceed to mark it off, delimit, or define it; and this definition is the establishment of its essential reality. Here we must remember the confusion which existed at the time as to the logical import of the copula in judgment. For Socrates, to say what a thing was implied that it was; or, to put it in another way, until Plato discovered the ambiguity and cleared it away in the *Sophist*, all propositions were supposed to have an existential import. When Socrates asserted that justice or equality or beauty was this or that, he implied that justice or equality or beauty existed—they were "things."⁴³ Hence a definition fixed the existence of the object defined.

⁴² *Anal. Prior.*, II, 21, 7.

⁴³ *Protag.*, 330 c; *Phaedo*, 65 d 4, 74 a 9. Socrates employed two phrases in commencing a definition: (a) "do you call soul something?" (*Gorg.*, 464 a 1, *Protag.*, 358 d 5, *Meno*, 75 e 1 and 76 a 1, *Phaed.*, 103 c 11); (b) "do we think or say that soul is something?" (*Phaed.*, 64 c 2, and 65 d 4). (a) asserts that the (term) soul has a meaning, (b) that the (thing) soul exists; but there appears to have been no distinction between the two phrases in Socrates' use of them.

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(6) The inductive definition was thus a way of investigating actually existent things by means of our judgments about them. In this respect Socrates ironically contrasts it with the scientific method of examining things directly; that is, no doubt, a simpler way, and his own method may be a "second best," a makeshift, for its arguments seem to be only images of things. But the trouble with the scientific method is that it will not work—at least, says Socrates, it did not work for him. So he turned to his new mode of investigating things by argument, which he believes to be just as true and valid as the other.⁴⁴

(7) The inductive method is merely one manifestation of the general logical method of Socrates, which he describes simply as putting together statements that agree.⁴⁵ Now this is nothing more nor less than inference, which depends in the last resort on a recognition of the agreement or consistency between two judgments; and Socrates' description of his method in his own informal way of saying that he reasoned about things, instead of investigating them directly. He thus developed the procedure which Parmenides had initiated. Furthermore, the reasoning now took the inductive form, when it was directed from particulars to the definition of a quality, and now the deductive form, when it proceeded from an assumption to its consequences.

(8) But the argument of Socrates was conditioned by the fact that he preferred to develop his thought in conversation, and not by lecture or by straight-away logical

⁴⁴ *Phaedo*, 99 d-100 a. The phrase *δευτερος πλοῦς* has long been a stumbling block and there is a considerable literature on the subject, for which see Archer-Hind's edition, Appendix II. It seems to me the difficulty is born of matter-of-fact temperament, which insists on being grave even where Socrates was ironical. cf. 97 b 7: "I am jumbling together another method of my own."

⁴⁵ *ibid.*, 100 a.

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processes set down in writing.⁴⁶ Now it is impossible to argue with a person unless the two of you can agree on some things; and Socrates' method therefore necessitated, first, an agreed starting point, and second, continued agreement at each stage of the argument. In other words, the logic of Socrates partook of the nature of rhetoric, to the extent that it was directed toward winning the assent of specified persons. It was thus in its largest aspect a human performance, a conversation between two personalities, the interaction of two points of view, even when Socrates seems to do all or most of it himself.⁴⁷ It was part of the agreement which was made at the start that one person should ask, and the other answer, questions. The latter was obviously at a disadvantage, and there are many instances in the early Dialogues where the respondent has to be reminded of his compact to do nothing but reply—his turn to ask will come later. The essential economy of the method is that it allows the free working out of the hypothesis or proposition by its protagonist, while yet forcing him to keep the bounds of reasonable inference at every step on pain of disagreement by his adversary. Thus both the argument and the man are on trial,⁴⁸ and the procedure as a whole indicates a feeling that it was not solely the exercise of what we sometimes call "pure" or "cold" reason, because the starting point depended to some extent on the man. Yet after this point has been agreed upon, there is constantly in the background the suggestion that by the very nature of the logical process, the argument must develop unswervingly along a straight line; even the answerer is compelled to answer in accord-

⁴⁶ cf. *Protag.*, 334 d-336 d.

⁴⁷ cf. *ἐμαντῶ ἀποκρίνεσθαι καὶ ἄλλω*, *Phaedo*, 100 d 9, e 1.

⁴⁸ *Protag.*, 333 c.

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ance with his previous admissions.⁴⁹ Thus Socrates seems to have felt the same compulsion of reason as Parmenides, but he allows for the human fallibility of it by realizing that the starting point may be the result not of reason but of feeling and so need to be examined separately later. His method at bottom consists in what we should call a thorough and logical working out of a particular point of view.

(9) The starting point is sometimes naturally and implicitly brought up in the course of a previous argument or conversation, and just as naturally and informally accepted; sometimes it is explicitly stated and formally recognized. In the latter case, it is referred to as the hypothesis of the subsequent argument.⁵⁰ In its simplest form, an hypothesis seems to be a proposition that was agreed to by both parties with the understanding that it would be used to develop a certain course of reasoning or establish a conclusion for a certain problem. The necessary feature of it was merely the agreement of the disputants to use it; hence the hypothesis most likely to be accepted would naturally be chosen. It is perhaps unwise to be too specific in our interpretation of so spontaneous a thing, but we may at least recognize three slightly different varieties. First, an hypothesis might be a desired definition, in which case the preliminary agreement would take the form, not of an affirmation, but of a fundamental question; as, for example, "Let us ask ourselves, What is the proper function of a good citizen?" "Agreed."⁵¹ Secondly, it might be a proposition whose truth had already been proved, as in the *Phaedo* (100 b) where the hypothesis is the existence of Forms, which had been established in the course of a

⁴⁹ *Meno*, 75 d 6.

⁵⁰ *Phaed.*, 100 a 3, b 5, 101 d; *Meno*, 86 e *sqq.*; *Xen., Mem.*, IV, 6, 13.

⁵¹ *Xen., Mem.*, IV, 6, 14.

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former argument (65 d, e). Thirdly, it might be a pure assumption, which, after its consequences had been thoroughly worked out, would itself have to be examined in the light of some higher principle.⁵² It is perhaps needless to say that these varieties are not consciously differentiated in any account of Socrates; and the word always kept its fresh and wide significance of any starting point formally agreed upon for an argument.

(10) When the argument concerns a quality or Form, it is proper to fix the definition of the Form before attempting to draw out its consequences.⁵³ In this sense, the definition might be regarded either as the hypothesis toward which an inductive process was directed (*terminus ad quem*), or as the hypothesis from which the subsequent deductive process started (*terminus a quo*).

If now we cast a summary glance over the preceding analysis, we will find first of all several things that Aristotle's statement about Socrates should not lead us to infer. We are not to suppose that Socrates' arguments were solely inductive, for the method of consequences was plainly deductive. We are not to suppose that the inductive arguments were inductive in the strict Aristotelian sense; they were inductive in the way that modern science is inductive, that is, by proceeding from an incomplete number of instances to a generalization. We are not to suppose that Socrates differentiated between induction and deduction, consciously choosing the former for definitions and the latter for consequences; he knew nothing of formal logic and merely wanted to argue things out in any way that would lead to the truth. And finally, it is worth saying again that Socrates was not content with

⁵² *Phaedo*, 100 d.

⁵³ *Meno*, 71 b 3; 86 d 4-e 2; cf. *Symposium*, 199 (first treat of the nature of Love, and then of his works).

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mere definitions; he wanted definitions in order to get true knowledge, which was of the greatest practical concern. His arguments were by no means the result of a tight system of logic, but were the spontaneous processes of a mind constantly boring down beneath the surface appearances of things, and convinced that, contrary to the sceptics, there lay there knowable verities of the highest value to men.

8. We have already had occasion to note in passing that Socrates believed philosophy served an ethical and religious purpose, and it remains for us now to examine his understanding of the ethical impulse in general, which I take to be his third contribution to philosophy. His views on this subject rest in the last resort on his conception of soul, and his ethical teaching is expressed in its most general form as an exhortation to care for the soul. That he held peculiar notions with regard to the human spirit is to be inferred from the *Clouds* of Aristophanes, and the testimony is valuable as indicating also that he must have become impressed with this subject at least twenty-five years before he died. Yet for the comic poet, Socrates was the head of a scientific school, offering formal instruction to the pupils who came to him. I think we must therefore infer that Socrates' dissatisfaction with natural science was connected with new ideas of soul; and that he may have begun to teach these new ideas of soul before he took up his mission. The mission would surely have lent itself admirably to comic treatment, and the fact that Aristophanes does not mention it would tend to show that it had not been undertaken when the *Clouds* was composed. In the *Birds*, which was produced nine years later in 414 B.C., there is a reference to Socrates' *ψυχαγωγία*, that strange intellectual fascination which was an out-

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standing feature of his earnestness in conversation, to which Alcibiades testified; and we know that such earnest conversations were his method of fulfilling his mission. Xenophon and Plato also picture Socrates as going about, conversing with everybody, accompanied by his disciples, and engaged in converting his fellow-citizens. What he preached was the care of the soul, a form of expression that was also known to Aeschines of Sphettus, Antisthenes, and Isocrates. But though much is said about the proper methods of exercising this care, there is almost no direct information on Socrates' conception of soul, and no evidence at all that it was considered in any way strange, as the treatment of Aristophanes had suggested. This would seem to indicate that Socrates did not formulate his thoughts on the nature of soul into a specific theory, but was content to preach his ethical doctrines without working out their psychological implications systematically. At the same time it appears that these implications were generally acceptable to his more thoughtful disciples or there would have been more comment on their novelty; so that we must imagine that philosophic circles were generally working toward some new conception of soul⁵⁴ and that Socrates' ideas on the subject readily became part of a common view. Plato apparently took over his Master's ideas and made his own contribution without realizing that they were original, and Aristotle in his *De Anima* has no reference to a Socratic doctrine on the subject. This can only mean, I say, that there was no separate Socratic doctrine of soul, but that the psychological implications of his ethical theories had already merged into the ordi-

⁵⁴ Democritus at the same time worked out a view of the soul that was in many ways strikingly similar to that of Socrates. cf. below, p. 183, n. 63.

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nary philosophy of the day. These implications, however, are of such importance that they will repay investigation as an introduction to the ethical theories.⁵⁵

9. There were current during the lifetime of Socrates several different and even mutually conflicting views of the soul. Probably the most common was the traditional Homeric notion of a bloodless, unfeeling shade or reflection of the former person, something that apparently did not become an entity until life was extinct, and then was in most cases immediately destroyed.⁵⁶ But in the sixth and fifth centuries B.C. this vague notion was supplemented by several other doctrines. The festival of Anthesteria and some of the mortuary rites would seem to indicate a very ancient belief in the existence of the shade within or about the grave, but probably this idea was largely a dying tradition in the time of Socrates.⁵⁷ There is considerable evidence of a belief that all shades go to

⁵⁵ For Aristophanes see the commentaries on *Clouds*, 94, 230, and *Birds*, 1555. *Clouds*, 137, refers to the miscarriage of a thought; but this need not imply *μαιευτική*, which was practised on others, while the thought of line 137 was the speaker's. Xen., *Mem.*, I, 1, 16, says that Socrates always aimed to find knowledge which would make men *καλοὺς καγαθοὺς*; cf. *τὴν τῆς ψυχῆς ἐπιμέλειαν* (I, 2, 4) and *ἡ τῆς ἀρετῆς ἐπιμέλεια* (I, 2, 8). The same language is found frequently in Plato's *Apol.*, e.g. 29 d, 31 b. Aeschines has the phrase *τοῖς τε φαύλοις τῶν ἀνθρώπων καὶ ἐν μηδεμίᾳ ἐπιμέλειᾳ ἐαυτῶν οὖσιν* (cf. Hermann, *De Aeschinis Socratici reliquiis*, p. 22). Antisthenes uses *τὴν ψυχὴν παιδεύειν* (Mullach, *Frag. Philos. Graec.*, II, p. 292, frag. 124), and Isocrates *τὴν τῆς ψυχῆς ἐπιμέλειαν* (*Antidosis*, 304, Blass). Other references in H. Maier, *Sokrates, sein Werk u. seine geschichtliche Stellung*, p. 333, n. 3. Professor Burnet's "The Socratic Doctrine of the Soul," in *Proc. Brit. Acad.*, 1915-16, p. 235, is most useful and scholarly, but I think his rigid classification has prevented him from making proper allowance for contamination of the various views; and it is inconceivable that the Socratic theory should have been as definite and as original as he suggests without exciting later comment.

⁵⁶ cf., e.g., *Il.*, XXIV, 14; *Od.*, XXIII, 66, 107; XXIV, 168. cf. *ὡς φασιν οἱ πολλοὶ ἄνθρωποι* *Phaed.*, 80 d 10, and *τὸ τῶν πολλῶν, ibid.*, 77 b 3.

⁵⁷ Harrison, *Proleg.*, chap. II; Mommsen, *Feste d. Stadt Athen*, p. 390; Ridder, *Idée de la Mort en Grece*, p. 51. cf. *Phaed.*, 81 d 1: *περὶ δ' (sc. μνῆματα) δὴ καὶ ὥφθη ἅττα ψυχῶν σκιοειδῆ φαντάσματα.*

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Hades, a place under the earth.⁵⁸ The rationalistic tendency is represented by the doctrine that the soul is present during life as air or breath, and goes at death into the upper atmosphere.⁵⁹ The Eleusinian Mysteries must have taught a still different idea of soul, as they promised some sort of happiness after death; but what it was we do not know. The Orphic societies maintained that the soul was divine in origin, incarnated as a punishment for some "ancient woe," and that it would return to god after a period of purification;⁶⁰ similar views were held by the Pythagoreans and Empedocles. Finally Ionian cosmology, as developed especially by Anaxagoras and Diogenes of Apollonia from the implications of Anaximenes and Heraclitus, had taken the position that the soul was part of the world principle, corporeal like it, and returning at death to the whole from which it had been separated. It is important to mark both the extreme diversity of these contemporaneous views, and also the similarity between the Orphic and the cosmological doctrines.

The functions of sensation, emotion, and thought were commonly attributed to the body, localized in the region of the heart or midriff, and for the most part unconnected with soul except in philosophy. Anaximenes had been the first to assign a bodily function to soul, but he apparently had thought of it merely as the life-giving principle of breath in men as in the world at large. Heraclitus had greatly extended the idea by making his fire-soul the organ

⁵⁸ The sepulchral inscriptions contain the phrases *eis 'Aīdao*, *eis 'Aīda*. cf. the black-figured pottery described by Furtwangler, "Charon, eine altattische Malerei," in *Archiv f. Religionswissenschaft*, VIII (1905), p. 191 (referred to by Burnet).

⁵⁹ Epicharmus, *ap.* Plutarch *Consol. ad Apoll.*, 110 A DFV, frag. 9, cf. frag. 22; Euripides *Suppl.*, 533; Kaibel, *Epigram. Graec.*, nos. 21, 41, 225. cf. *Phaed.*, 70 a.

⁶⁰ Herod., II, 81, 123; Arist., *De An.*, I. 5, 410 b 28.

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of directive thought. Parmenides seems to have adopted a similar notion, as he held that thought is "that of which there is most" in the body, that is, it is the preponderating element light or dark; he does not, however, say that it is soul and we are left to infer his belief from his probable connection with Pythagoreanism. Empedocles is most interesting because he seems to combine the Orphic idea of the soul as "an exile and a wanderer from the gods" with the scientific view that thought is the blood around the heart, where the elements are most evenly mixed by Love, and that death means dissolution; but we have no right to say that he is guilty of a glaring inconsistency here, for he may have held that an individual soul was really that microcosmic Love "implanted in the frame of mortals," especially at the heart, and that it returns to the macrocosmic Love, who is a god, when the elements are dissolved at death. Anaxagoras believed that Mind, the principle of movement, enters into living bodies, and Diogenes of Apollonia held the same idea of Air. All these philosophic systems had made the soul corporeal, a part of the world principle, and the cause of life in the body. Moreover in all these systems, the principle had directive power and was considered a divinity, and in some of them certainly it was specifically given the capacity of thought. Heraclitus had called it "the thought by which all things are steered through all things"; Empedocles had claimed that god (Love) was "only a sacred and ineffable mind flashing through the world with rapid thoughts"; and Anaxagoras during the lifetime of Socrates had united cognitive discrimination with physical control as the attributes of Nous. It was natural for such a keen-witted, inventive, and self-sufficient people as the Ionians to identify directive power with thought. For philosophy

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then, the soul was part of the material principle of the world, and returned to it at death; it was the cause of life in the body and was (sometimes at least) believed to have the capacity of thought.⁶¹

The extraordinary fluidity of the notion of soul easily permitted numerous combinations of different views and thus led to further extensions of the term. It had been in use from the time of Homer in the indefinite sense of life or existence—something that could be lost, fought for, or kept. It was employed by Herodotus and the Tragedians to signify spirit, courage, or emotional disposition. And it is sometimes found with such secondary meanings as passion, desire, or the semi-conscious state of infancy or of dreams.⁶² It is apparent that the word could be used, and was used, for almost any part or activity of the self; but it never seems to connote the whole self, as we know it, until we come to the Socratic literature and the fragments of Democritus. There is no evidence that either Democritus or Socrates knew the theories of the other, though they developed views of the soul that have some striking similarities.⁶³ We may therefore suppose

⁶¹ Anaximenes, frag. 2, *DFV*, p. 21; on Heraclitus, see above, pp. 58 ff.; Parmenides, frag. 16, *DFV*, p. 124; Empedocles, frag. 115, l. 13, frags. 105 and 15, *DFV*, pp. 207, 202, 177, and above, p. 91; for Anaxagoras, Arist., *De An.*, I, 2, 405 a 13; Diogenes, frag. 5, *DFV*, p. 335.

⁶² For references see Liddell and Scott s.v. and Burnet, *The Socratic Doctrine of the Soul*. Professor Burnet's method seems perverse. He first rules out of court the use of the word for courage or spirit, and then says that in presocratic literature "the one thing you cannot do with a *ψυχή* is to live by it." But see Burnet on Heraclitus, *Gk. Phil.* I, p. 59. And when Herodotus (V. 124) says that Aristagoras was *ψυχὴν οὐκ ἄκρος*, he means that the spirit of his whole life was poor or timid; and when Creon in the *Antigone* 176 claims that you cannot know a man's *ψυχὴν τε καὶ φρόνημα καὶ γνῶμην* before he is proved by public office, the poet is referring to the spirit which is part of the real man. But whether you can live by a *ψυχή* or not is not the point, which is rather how much of the inner self does *ψυχή* cover.

⁶³ It seems to me that in Democritus, as in Socrates, the Eleatic dialectic acted like a ferment or a catalytic on the mixture of natural science and

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that what Socrates did in Athens was to put together the various ideas of the inner person in a rather indefinite concept that included what we mean by the terms consciousness, personality, and soul. He was far too unsystematic to elaborate a complete psychology, and in his later years at least he cared nothing for physiology, so we do not know whether he localized the thinking faculty at all.⁶⁴ But he had quite evidently taken over the cosmological view of soul, possibly from Anaxagoras, who, he says, interested him greatly in his earlier years; and he had worked in with this notion a number of Orphic elements (such as immortality, purification, and reincarnation), which he could easily have learned from his Pythagorean friends. This combination was made possible by his understanding of incorporeal force, so that he could hold the essence of the Ionian view without having to believe that the soul was corporeal. But he so extended the application of this composite idea, possibly under the influence of the Philolaic Harmony-soul which was the constitutive principle in the individual, that it took on the more general significance of character, that which is most real in a human being.⁶⁵

Pythagorean mysticism, which influenced each of them, although Democritus was far less susceptible to Pythagoreanism than Socrates seems to have been. For Democritus on care of the soul, see frag. 187; on soul as the organ of νοῦς, λογισμός, φρονεῖν, frags. 105, 187, and Theo., *De Sensu*, 58; as directive power, frag. 159; as moral character and personality, frags. 170, 171, 191. Democritus of course could not admit personal immortality.

⁶⁴ But *Phaedo*, 96 b, shows that he knew all the theories on the subject.

⁶⁵ Owing to Socrates' anthropocentric interest, we must expect to find the cosmological notion of soul chiefly in its microcosmic aspect; nevertheless in Xen., *Mem.*, I. 4. 17 (cf. *ibid.*, 8) Socrates speaks of τὴν ἐν τῷ παντὶ φρόνησιν, and φρόνησις is an attribute of the soul, *Mem.*, I. 2. 53. For soul as principle of life in the body see e.g. *Phaedo*, 94 b 4, *Mem.*, I. 4. 9. and 13; as divine, immortal, *Phaedo*, 106 e, *Mem.*, IV. 3. 14; as invisible, *Phaedo*, 79 b, *Mem.*, IV. 3. 14; as sentient, conscious, intelligent, *Phaedo*, 83 c 3, *Protag.*, 313 c 7. The idea of soul as character or self comes out in the turn of many phrases, e.g. *Protag.*, 312 b 8, 313 a 6; *Phaedo*, 90 e 1; *Meno*, 88 c 1; *Mem.*, I. 2. 19-23.

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Furthermore, insofar as cosmology had attributed thought to soul, the soul was a conscious thing; but since that thought was preeminently about external objects, the soul was not fully self-conscious. And though the Eleatics and some of the Sophists had to a small extent turned their attention to the problem of thinking, they had left the soul out of the problem, so that their inquiry was what we would call epistemological rather than psychological. But Socrates both attributed thought to soul and also turned that thought back upon itself, so that soul became for the first time a truly self-conscious thing. As what we mean by human consciousness really includes self-consciousness, we may say that Socrates was the first to imply an adequate notion of consciousness.

10. With this idea of soul there naturally went certain ideas or beliefs about the gods. An immortal soul-personality seems to carry with it the idea of personal divinity. But there was no precision in Socrates' conception of divinity, and of course the question of one god or many did not occur. Such expressions as *ὁ θεός, οἱ θεοί, τὸ θεῖον, τὸ δαιμόνιον, ὃ ἐξ ἀρχῆς ποιεῖν ἀνθρώπους* and others of similar character, found in Plato's and Xenophon's accounts of their Master, indicate how vague and ill defined the idea of divinity remained in his mind.⁶⁶ In fact, Plato represents him as accepting the existence of the gods, yet holding that it is impossible to know about them with certitude.⁶⁷ Xenophon has him argue to the existence of god as a necessary postulate to explain creation and intelligence; but these arguments, like those of the *Phaedo* on immortality, are evidently meant to produce a certain

⁶⁶ *Apol.*, 35 d, 41 d; *Phaedo*, 62 c 2 and 7, 63, 80 a 3; *Mem.*, I, 4. 5 and 13, IV. 3. 14.

⁶⁷ *Apol.*, 40 c., *Phaedo*, 62 b 5, 114 d 1; cf. *ibid.*, 85 c 2, where Simmias attributes uncertainty to Socrates.

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ethical attitude rather than constitute a logical demonstration.⁶⁸ Both Plato and Xenophon deny that Socrates introduced strange divinities, and they describe him as maintaining the traditional beliefs and practices in regard to oracles and sacrifices, and making free use of such popular expressions as Hades and Fate.⁶⁹ But there was one point on which he would suffer no shadow of doubt, and that was that the gods are good and will take care of good men.⁷⁰ Indeed a consideration of all the evidence suggests that it was just the presence of goodness in the world that gave him his assurance of god. For our own satisfaction we might paraphrase his general notion of divinity in a summary fashion as follows: real knowledge comes through a definition of Forms, and is in the nature of the case impossible with regard to the gods; but we have all the understanding of the gods that we need through oracles and the holy myths of seers and prophets; and finally it seems impossible to explain the presence of goodness and its equivalent intelligence in the world save on the assumption of some eternal intelligent principle of Goodness.

11. Such being the soul and its relations, Socrates preached the care of it as the highest duty of man. The particular kind of care which he urged is brought out in the doctrine that the excellence of soul is knowledge, with the ancillary proposition that knowledge is reminiscence. Plato, Xenophon, and Aristotle are in complete harmony in reporting that Socrates held virtue to consist in knowl-

⁶⁸ *Mem.*, I. 4. 2-19.

⁶⁹ *Mem.*, I, 1. 2-9; *Anab.*, III. 1. 5-7; *Apol.*, 20 e; *Phaedo*, 107 a 1, 108 a 2, 113 a 3, 115 a 5; *Gorg.*, 512 e 3.

⁷⁰ *Phaedo*, 62 b 7; *Mem.*, I. 4. 18.

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edge.⁷¹ In a wide sense, this proposition was old, for it had formed the implicit basis of cosmological speculation; but Socrates so enriched the meaning of its two terms that it acquired an entirely new significance.

Of course "virtue" is a bad translation of *ἀρετή*; our modern materialism has tended to confine the idea of virtue to those sporadic cases of extraordinary kindness and sweetness that seem unnecessary and quite ineffectual in the hurly-burly of a predominantly economic existence. But *ἀρετή* meant simply that condition in which an individual was at his natural best, the excellence which is implied by natural constitution. The *ἀρετή* of a horse is that respect in which the best horse excels all other horses; the *ἀρετή* of a person is that excellence which is the full flower of a personality. Now the cosmologists had apparently held that human excellence, so far as they thought of it, lay in appreciation of, and conformity to, the rules that govern the world; while the Sophists, looking only at the external activities of man as a member of society, had defined his *ἀρετή* as efficiency or success in accomplishments—a sense in which the Shakespearean character Marina employs "virtue" in the phrase: "I can sing, weave, sew, and dance, With other virtues" (*Pericles* IV. 6, 199). But Socrates, believing that a man was a man only because he had a soul, claimed that virtue was excellence of soul. Inasmuch as the activity of soul was practically conditioned by social existence here and now, he agreed with the Sophists in defining virtue in practical terms; but insofar as this activity proceeded from an immortal entity which had implications beyond its pres-

⁷¹ Plato, *Lach.*, 144 d; *Meno*, 86 b; *Protag.*, 352-end; Xen., *Mem.*, III. 9. 4, IV. 6. 7; Arist., *Eth. Nic.*, VI. 13. 3 and 5; cf. *Eth. Eud.*, I. 5, 1216 b 6.

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ent existence, he agreed with the cosmologists that human excellence must in the last resort involve the relation of man to the supreme power of the world.

We have already seen what Socrates meant by knowledge. On the subjective side, as we should say, it was an activity of soul as consciousness; and objectively it denoted *par excellence* eternal and immutable Forms, causes, or ideas. It was differentiated from the natural science of the cosmologists in that its objects were matters of practical experience, and from the wisdom of the Sophists by its consideration of the soul, which could never be defined completely by its external manifestation or line of action.

The proposition that virtue is knowledge may therefore be interpreted by this modern paraphrase: a human being reaches his highest capacity in that exercise of soul which is known as the rational faculty. Now the first point to be noticed in understanding this doctrine is that in taking over the scientific notion of the soul, Socrates had apparently accepted the dual nature of psychic activity, as posited especially by Anaxagoras; that is, thought was conceived to be both rational discrimination and directive power.⁷² In fact, the latter was assumed to be merely a property of any and all ideas in the soul, and the problem of the good life thus became simply how to establish correct ideas in the soul. There was no question of will in our sense at all, since it was taken for granted that an idea would by its inherent nature issue in appropriate action. This point of view is not a peculiarity of Socrates, but underlies all classical Greek ethics, though Plato and especially Aristotle appreciated that the matter was not quite so simple as it appeared to Socrates. The conception of the will as a separate mental faculty is probably an

⁷² cf. e.g. *Phaedo*, 80 a; *Protag.*, 352 and below, p. 190.

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ancient Jewish religious notion, which Christianity, aided by Roman moralists, has perpetuated.⁷³ One cannot escape the suspicion that much of our modern thinking on the subject involves the hypostatization of a mental function, and we ought not to let our traditional notions blind us to the fact that the Greeks avoided this pitfall, though they fell into others. For them the problem of conduct was not how to make a good idea effective through the fiat of some executive office within us, but how to give the right direction to our whole mental life. There is, they would claim, a general tendency in the activity of every mind, which determines the choice of means in each particular case. The difficulty is to get the mind tending in the proper direction; once that is done, the rest will take care of itself, for choice of means will then be raised to the intellectual level where it becomes merely the discrimination between what helps and what hinders the tendency.⁷⁴ That is solely a matter of knowledge, and virtue therefore becomes the intellectual discrimination between what is good and what is bad for the soul, both as end and

⁷³ It would seem that the need for a will is likely to be felt in proportion to the recognition of moral weakness or uncleanness. Such feeling is a commonplace of the O.T.—the Prophets are filled with it—and it passed over into Christianity from Judaism. But few traces of such a feeling are found in Greek literature; the Greeks were too natural to be weighed down by a consciousness of sin. Such a state of mind as is expressed in the words "For the good that I would, I do not; but the evil which I would not, that I do" (*Romans* 7. 19) was quite foreign to Greek ideas; even the doctrine of bloodguiltiness and the mystic fall of the soul have an occidental particularity and naturalness about them that are wanting in the general feeling of guiltiness before the Lord. Hebrew and Christian ethical thought is dominated by a god of righteousness to a degree quite unknown among the classical Greeks. Sin and righteousness are intelligible only by final reference to God; *κακόν* and *δικαιοσύνη* can exist without any god or with gods that are not moral. Religious ethics emphasizes human weakness by contrast with divine perfection.

⁷⁴ In *Protag.*, 356 b, the control of conduct is reduced to a skilful weighing of pleasures and pains; in 357 a the salvation of life is said to depend on *ἐπιστήμη* in the form of a *μετρητική τέχνη* in the matter of a right *αἵρεσις* of pleasure and pain.

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as means. The moral life is thus like walking along a road; the one thing needful is to get a person going in the right direction; if he meets a vehicle, he will get out of the way without having to be convinced that he ought to and then making himself do it.

And yet we must admit that to our way of thinking, life is rarely as simple as Socrates thought. On the one hand, if we adopt James' definition of will as "a relation between the mind and its 'ideas,'" we are nearer to the Greek conception than to the religious dichotomy of reason and will; but we should have to say that Socrates underestimated the complexity of this relation. For example, a good idea may be inhibited by other ideas simply because it has not the urgency necessary to compel attention to it. On the other hand, if we accept the German notion of will as the expression of the impulse for self-preservation and the desires that arise therefrom, we should have to say that Socrates failed to take proper account of the relation between soul and body. For example, an idea may be inhibited by habits or subconscious complexes. But Socrates was apparently satisfied with his belief that the soul was divine, that it was akin to the simple and unchanging, and that it was the organ of ideas.⁷⁵ He was aware that the soul and the body are in contact, and even that the latter may affect the former, for he believed that the soul was dragged down, so to speak, by using the bodily organs of sensation.⁷⁶ But he also believed in a pure activity of thought, as for example in the reminiscence of ideas; and he underestimated the extent and the complexity of that great mechanism of imagery, habit, and instinct, which join the adult mind and body. His exaggeration of

⁷⁵ *Phaedo*, 79 b ff.; *Xen., Mem.*, IV, 3. 14.

⁷⁶ *ibid.*, 79 c, d.

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the thinking faculty should be considered along with Eleatic claims for the validity of thought and his own assumption of the existential import of propositions as the uncritical presuppositions of logic in its initial stages.

12. The notion of a pure activity of thought is brought out in the theory that knowledge is reminiscence.⁷⁷ The mythical embellishment of this doctrine has obscured its real importance; I have a suspicion that it was probably the most original and the most fundamental of all Socrates' contributions to philosophy. We may approach it thus. From the ethical point of view, the great problem is to choose what is good for the soul; but what is good for the soul or what is the standard of goodness? From the epistemological point of view, the problem is to appreciate those universal Forms or ideas which are the essence of reality; but how can you find these Forms if you do not know what they are? On the methodological side, the problem is to awaken a love of knowledge; but how can you cause men to love that which they have not got? The doctrine of reminiscence with its corollary theories attempts to answer these questions, roughly speaking, in the following way. Since we have certain intellectual standards or values which do not come from sensible experience but which we apply to sensible experience, we must have come into the world with these standards, that is, we must have known them in some previous state of existence. But this implies (1) that there are such standards, (2) that they can be known, (3) that the knowledge of them is latent in every mind. The first of these propositions shows that there is such a thing as Goodness, pure, simple, absolute,

⁷⁷ *Meno*, 80 d; *Phaedo*, 72 e. One should compare the legend that Pythagoras remembered what happened in his previous incarnations, *DFV*, p. 24, l. 25, and Empedocles' claims in frags. 117-19, *DFV*, 6. 208.

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by itself; and it is by directing all activity toward this true Goodness that the soul does what is good for itself. From the second proposition it follows that knowledge is really the process of recognizing, or becoming fully conscious of, these standards. And the third thesis suggests that, since knowledge in the strict sense is the process of becoming fully conscious of what you already partially have, love of knowledge is simply appreciation of self.

Before leaving the subject, there are a few particular points that need further exposition. In the first place, the fact that Socrates drew the wrong conclusion from the existence of universal standards ought not to obscure the real value of his main position from us. He was on the track of *a priori* knowledge. He explained this knowledge by the hypothesis of previous existence of the knower, a notion which rouses the instant opposition of our instinctive feelings. But his assertion of an activity of mind and a quality of thought that are not explicable in terms of sense experience still remains after the mythical setting has been torn away.

Secondly, the standards or universals are frequently dismissed as "hypostatized concepts," a smacking mouthful to the evident gratification of the superior modern author. But the matter is not so easily disposed of. The Forms, as we have seen, were primarily causes—Goodness causes good things to be good, and Beauty makes things beautiful. But in so far as they are causes, they are no more hypostatizations than gravitation, magnetism, energy, attraction, and other modern scientific concepts of force. Socrates did not hold that the mind *made* the Forms in its previous existence, but that it came to *know* them as existent objects of knowledge. What we do have a right to ask him is how he can identify a universal standard,

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value, or principle with a cause operating in the physical world; but that raises the problem of the objective validity of all thought, and he was probably wise to treat of it in a myth.

Again, since he believed that the Forms or causes really existed, becoming conscious of them was the establishment in the mind of things that exist; and a definition had an existential import, not because the mind made ideas into things, but because the thing was really existent in thought before it was thought of. Thought fixed reality only insofar as reality was thought.

And again, since learning was the process of becoming fully conscious of ideas already latent in the mind, a friend might be of aid by way of suggestion or irritation, but he could not give you ideas which you did not already have. Hence the proper method of teaching was not the lecture, which was an attempt to put one mind into another mind,—an impossible piece of violence from the Socratic point of view,—but a gradual eliciting or awakening of the dormant idea, such as could only be effected by questioning. The teacher was thus a questioner and the taught an answerer, and the whole procedure was no more than conversation, *διαλεκτική*, in a special aspect. It was not even necessary to assume that the teacher knew more than the learner, and their rôles might be reversed; Socrates himself steadfastly disclaimed any special knowledge, and he interpreted his mission as the task of convincing his fellow Athenians of their ignorance. He proceeded to do this by means of discussions, and Socratic dialectic always retained this simplicity of conception; it certainly never was stereotyped in formal theories of methodology or metaphysics, such as it became in the systems of Plato and Aristotle.

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13. We ought now to see that Socrates was not guilty of a circular argument when he said the soul should strive toward Goodness, and then spoke of Goodness as what is good for the soul. Goodness was to his mind a reality independent of all souls but capable of being partially apprehended and appropriated by any soul. The real and final dissatisfaction which we are likely to feel with Socrates' position arises from the fact that he never succeeds in defining the content of that Goodness. And this illustrates a more general deficiency in his philosophy as a whole, namely, the vagueness of the concepts in which it ended. There were two main aspects of his thought, the ethical and the epistemological; in the former, he urged that a proper regard for the soul demanded that all actions be directed toward an end which was conceivable, intelligible, but he does not enable us to define that end positively; on the epistemological side, he maintained that knowledge was a group of pure conceptual "reals," but again he never settles on any definite content for these Forms.⁷⁸ It was not that he was sceptical, I think, for his whole method assumes the possibility of knowledge, and his irony was always humorous. Rather he was personally too diffident in his own intellectual capacity to go further, and also he conceived his own particular mission to be a clearing away of false notions and the smug self-satisfaction that remains content with them. In the course of that clearing away there emerged certain positive implications

⁷⁸ cf. Zeller, *Socrates and the Socratic Schools*, p. 123 (Reichel): "Just as his speculative philosophy stopped with the general requirement that knowledge belonged to conceptions only, so his practical philosophy stopped with the indefinite postulate that actions must correspond with conceptions." For the function of negative dialectic, see Grote, *Plato*, I, pp. 241 ff. This aspect of Socrates has been overlooked by most recent writers.

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of a general and indefinite nature, which he maintained with all the skill and vigor of his vivid personality and his extraordinary mind. But the systematic development of these implications he left to his successors.

CHAPTER XI

THE ATOMISTS

1. WE have endeavored to trace the course of the idealistic tendency to the point where it brought forth a separate systematic philosophy. We must now go back to cosmology again and follow the development of the opposite, materialistic disposition to an analogous point. We may think of the Eleatic position as the crux in the evolution of Greek reflective thought; this school suggested the impossibility of finding a principle of unity in the phenomena of sense, and at the same time they asserted the necessary implication of unity for reason. We may think of the systems of Empedocles and Anaxagoras as unsatisfactory and unsuccessful attempts to straddle the Eleatic fence by forcing phenomena in their plurality under some kind of unifying forces. That first-rate minds among the Greeks did not continue these attempts at compromise bears testimony to the general acumen of their intellectual circles. Instead, their philosophy split up into the two types mentioned above, each type being worked out in a simple, direct, and self-consistent system. The idealistic type, gaining its impetus from the prevalent humanistic movement but based ultimately on the Eleatic doctrine of a conceptual reality, was an endeavor to explain the world by an appeal to the nature of mind or intelligence with its unifying faculty. The materialistic type, which was really a continuance of the original cosmological impulse but, as

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a separate tendency, formed a negative reaction to Eleatic denials of phenomena, was an attempt to explain the world by a frank acceptance of the plurality of matter as the ultimate reality. Moreover the atoms of Leucippus and Democritus as well as the Forms of Socrates and Plato were in different ways lineal descendants of the Eleatic What-is, and neither would have been possible without the Eleatic development of pure thought.¹ Furthermore, though the humanistic movement may be regarded as more clearly interwoven among the strands of Idealism, yet it will appear that the same movement profoundly influenced the course of Materialism, which thus close to its inception faced the problem of explaining intelligence in terms of matter. And finally we must note that, as the Idealism of Socrates, its founder, was relieved of its narrow limitation to human affairs by the broader system of his successor, Plato, so the cosmological restriction of Leucippus, the founder of pluralistic materialism, was immediately given up in the broader system of his successor, Democritus.

2. The proper appreciation of Atomism is rendered extraordinarily difficult by our ignorance of the historical circumstances of its authors, especially in regard to chronology which is here of the greatest importance. We are reduced to a consideration of probabilities, but the following account seems the most likely. Both Aristotle and

¹ As a *reductio ad absurdum* of pluralism, Melissus had argued: "If things were many, they would each have to be such as I say the One is" (frag. 8, 2, *DFV*, p. 147). Leucippus had accepted this conclusion, and his atom was the Eleatic One in all save size and immobility. On the other hand, the Socratic idea was a development of the Pythagorean Form (cf. above, pp. 163, 164) in the direction of the Eleatic One; it was unchangeable, eternal, indestructible, intelligible—an intellectualized One, as it were. Both atom and Form were frankly unperceivable, and could be plausible only on the Eleatic assumption of the validity of reason as distinguished from the senses—a fact which Leucippus probably understood hardly at all, Democritus partially, and Socrates quite completely.

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Theophrastus make Leucippus the founder of Atomism;² the denial of the existence of any such person, first made by Epicurus, must therefore be thrown out of court.³ Leucippus was a native of Miletus, but probably went to Elea, where he was for a time a member of the school of Parmenides and Zeno;⁴ it would appear most unlikely that he should have gone from there to Abdera, or that he ever was in Abdera.⁵ It seems best to suppose that Democritus, who was a native of Abdera, in the course of his extensive travels met Leucippus, became his pupil for a time, and brought back to Abdera a copy of his book.⁶ Democritus undoubtedly knew and was influenced by his fellow-citizen Protagoras, though there is no direct testimony to this effect; he is said to have met Philolaus also and to have become acquainted with the Pythagorean philosophy.⁷ On the whole, it is improbable that he visited

² Arist., *Met.* I. 4, 985 b 4; Theo. *ap. Simpl.*, *Phys.*, 28, 4, *DFV*, p. 344.

³ Diog. X. 13, *DFV*, p. 343, 2. The mistake of Epicurus may be perhaps explained by the fact that the Atomist School produced a number of works which were soon formed into a corpus and attributed to Democritus, like the medical corpus attributed to Hippocrates of Chios. For a full discussion see Zeller, II, p. 837, n. 4, and *RP*, 185 b.

⁴ Theo., *loc. cit.*; Burnet, p. 382.

⁵ In the first place it is difficult to discover any plausible motive to take him to Abdera. He certainly could not have been drawn thither by Protagoras, as there is not a suggestion that he was influenced by Humanism; that is the difference between him and his pupil Democritus. Furthermore if he had ever had Democritus as his pupil in Abdera, Democritus could hardly have been regarded as the founder of the school there. That he was so regarded may be inferred from the fact that the writings of the school seem to have gone out under the name of Democritus, and that Aristotle speaks of *οἱ περὶ Δημόκριτον* (*De Coelo*, III. 6, 305 b 1) but not of *οἱ περὶ Λεύκιππον*. We may suppose that Leucippus was called an Abderite by certain authors (Diog. IX, 30, *DFV*, p. 342) because the founder of Atomism was confused with the founder of the Abderite school which taught Atomism.

⁶ For the evidence that Leucippus wrote a book, see Zeller, II, p. 838 n.

⁷ Glaucus of Rhegium (a contemporary) and Apollodorus of Cyzicus (a later member of the School) *ap. Diog. L.*, IX, 37, *DFV*, p. 351. This appears to be confirmed by certain elements in the system of Democritus, e.g. the use of *σκήνος* for the body, the healing of the soul by wisdom, the compari-

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Athens.⁸ When he returned to his native city, he founded a school which taught the Atomist doctrine much broadened and enriched by contact with Pythagorean science and the new Humanism.⁹ All things considered, it is easiest to imagine Leucippus as a younger contemporary of Anaxagoras, and Democritus as active during the last quarter of the fifth century and the first ten or fifteen years of the next.¹⁰

3. The core of the Atomist cosmology can be stated in a few fundamental propositions given by Aristotle as follows: "That which in the proper sense is (real) is completely full; but that which satisfies this condition is not a single thing, but an infinite number of things that are invisible on account of the smallness of their bulk. These things move in the void—for there is a void—and when they come together, they produce generation; when they disperse, they cause destruction." In its simplest terms, the world is innumerable atoms moving in an infinite void.¹¹

son of atoms with letters of the alphabet (given by Aristotle, but likely to be Democritean in origin), the emphasis on shape-size.

⁸ See above, p. 108, n. 1.

⁹ The evidence for the school is very meager, but several "Democriteans" are named, e.g. Nessus, Metrodorus, Anaxarchus, Apollodotus, Diotimus. cf. Diels "Ueber die ält. Philosophenschulen d. Griech.," in *Philosophische Aufsätze* Ed. Zeller *gewidmet*.

¹⁰ The chronological evidence is given by Zeller in his notes. Burnet (*Gk. Phil.*, p. 194) says: "If Democritus died, as we are told, at the age of ninety or a hundred, he was in any case still living when Plato founded the Academy" (about 387-6 B.C.).

¹¹ Arist., *De Gen. et Corr.*, I. 8, 325 a 8. Aristotle attributes these propositions specifically to Leucippus, but he makes it plain (*ibid.*, 324 b 35) that both Leucippus and Democritus started from the same cosmological postulates. Aristotle appears thoroughly versed in the physical doctrines of Atomism, speaking of its various doctrines with a confidence born of much study of the original documents, and distinguishing the work of Leucippus and Democritus at certain points. He may have been especially interested in Democritus as a fellow Ionian of the North, as Professor Burnet suggests.

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Besides these explicit doctrines there seem to have been two general presuppositions which underlay the Atomist cosmology, though we cannot be sure how definitely they were conceived by Leucippus and Democritus. The first was the Eleatic axiom that no thing comes into being out of another thing; Aristotle refers this axiom to Democritus, but we must believe that it was at least implied by Leucippus.¹² The second was the axiom that motion is possible only in a void; this was also an Eleatic contention, the acceptance of which Aristotle refers to Leucippus in language which does not indicate plainly whether the Atomist philosopher merely suggested it by implication or expressly stated it.¹³ There cannot be the slightest doubt, however, that both of these presuppositions influenced the thought of the founders of this philosophy.

If we now apply these assumptions to the previous bare conception of atoms, it will follow that the atom is uncreated and indestructible; and that, having no empty space in itself, it will not permit internal movement and is therefore unchangeable *per se*. It is also physically indivisible, but is theoretically divisible because it has bulk. Again, all atoms have the same substance, but they differ in shape, which probably included the notion of size. Externally atoms are further distinguishable by their position in the world and in the groups or masses of which they form part. Finally the atoms, infinite in number, allow of infinite differences in shape and position.¹⁴

¹² Arist., *Phys.*, III. 4, 203 a 33.

¹³ Arist., *De Gen. et Corr.*, I. 8, 325 a 26; *Phys.*, IV. 6, 213 b 5.

¹⁴ Besides the previous references, Arist., *De Coelo*, III. 4, 303 a 5; *Met.*, VII. 13, 1039 a 9; *Phys.*, VIII. 1, 251 b 15; *De Gen. et Corr.*, I. 7, 323 b 10; *Simpl.*, *Phys.*, 82, 1. There is a looseness of expression and probably of conception in regard to the differentiae of atoms. In *Met.*, I. 4, 985 b 15, Aristotle says Leucippus and Democritus held that the real (atoms) differed *ῥυσμῶ καὶ διαθρύῃ καὶ τροπῇ μόνον*, and he translates these Ionic terms into the Attic *σχῆμα, τάξις*, and *θέσις*. The first obviously means shape or form, and

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At first view it might appear that the Void was merely the opposite of the Full, for it was that which existed where the full did not exist; but the opposition ends here, and there was no active relation or interaction between the two. The void was not mere nothingness, for it existed¹⁵ and was infinite in extent,¹⁶ as the atoms were infinite in number. It was empty space, and the first really empty space conceived in Greek philosophy; but it was probably not imagined as geometrical space or mere extension. On the other hand it was not air, which Empedocles and Anaxagoras had shown to be corporeal. It existed between atoms but it did not prevent atoms from touching; yet it was in all things that were compounded of atoms.¹⁷

Motion was not conceived as opposition or interaction between the two principles, the Full and the Void; and though it was not carefully described by either Leucippus or Democritus, to judge from the remarks of Aristotle, yet it was probably assumed as an original property of

applies to all atoms; it appears to include the notion of size (cf. the same dual notion in Philolaus, above, p. 139, and Aristotle's description of atoms as numbers). The second and third terms must mean arrangement in groups and position in the world, respectively, and apply only to atoms which are in groups or worlds; they are secondary, external, unessential differentiae as compared with shape. The fact that shape-size is the only primary differentia can be inferred also from the fact that the atoms were called *ιδέαι* or *εἶδη* (Burnet, p. 336, n. 5) and *ἀριθμοί*. Yet the essential and the secondary characteristics are put together without distinction, and they must go back to the Atomists on account of the Ionic terms. This ought to suggest that the Atomists were not so definite and clear in their concepts as Zeller and some other modern commentators try to make out. Furthermore the fact that these terms must be those of Democritus at least and that they are the *only* differentiae, according to Aristotle, indicates that weight was not regarded as even a secondary characteristic of atoms.

¹⁵ Arist., *Met.*, I. 4, 985 b 4; *Simpl.*, *Phys.*, 28, 13, *DFV*, p. 345 (representing Theophrastus); *Plut.*, *Adv. Col.*, 4, 2.

¹⁶ Arist., *De Coelo*, III. 2, 300 b 8.

¹⁷ *ibid.*, I. 7, 275 b 29; *Phys.*, III. 4, 203 a 19; *De Gen. et Corr.*, I. 8, 325 b 29; *Met.*, IV. 5, 1009 b 27.

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atoms.¹⁸ Such a doctrine, as Professor Burnet remarks, would be a return from the Empedoclean and Anaxagorean postulates of force to the earlier idea of motion as an inherent and natural attribute of things. Apparently the first motion of the atoms was simple, unqualified movement in the void. It is possible that each atom was supposed to have had a motion as peculiar to it as its shape was; but probably even such a statement imputes to the Atomist system greater definition than it really had. In any case it appears almost certainly unjustifiable to attribute to Leucippus and Democritus a belief that the original motion was a fall through space. What Aristotle says is that the atoms were endowed with motion; if this theory was unsatisfactory to him and is more unsatisfactory to modern commentators, it does not follow that it was so to the Atomists. What seem to us "the immediate and necessary corollaries of their own hypotheses"¹⁹ may not have seemed either immediate or necessary to the original authors. It is enough for us, without spilling any more ink on this ancient controversy, to accept Aristotle's statement that the Atomists started their cosmology with atoms moving in a void.

¹⁸ Arist., *Met.*, XII. 2, 1069 b 22; 1071 b 31; 1072 a 6. When Aristotle says of the Atomists (*Phys.*, VIII. 9, 265 b 23): *διὰ δὲ τὸ κενὸν κινεῖσθαι φασιν*, we must accept the interpretation of Simplicius, *διὰ τοῦ κενοῦ ἐκόντος καὶ μὴ ἀντιτυποῦντος*. The void was merely the negative condition of motion.

¹⁹ Zeller, II, p. 877. Zeller held that the atoms had weight and that the original motion was a fall through space. I have already spoken about weight (above, p. 200, n. 14). The fall is for Zeller primarily a necessary deduction from the weight, but he also refers to *Simpl., Phys.*, 319 a and Theophrastus *De Sensu*, 71. The former passage, however, gives the view of *οἱ περὶ Δημόκριτον*, that is, the followers of Democritus, and it may also involve a confusion with the Epicureans; moreover it does not mention a fall of atoms, but only their movement in accordance with their weight, which might be "up" for the lighter atoms. The second passage is not a description of the Atomist views but merely an argument of Theophrastus, similar to that of Arist., *De Coelo*, I. 7, 275 b 29, both of which references imply that the Atomists did not give the atoms a single motion, as they should have.

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4. From this beginning the Atomists had to deduce the cosmological process. The best account of their theory on this point, given by Diogenes but based on an epitome of Theophrastus, may be paraphrased and simplified thus. A number of moving atoms, colliding and becoming entangled with one another and separate from the rest, produced a vortex, in the course of which atoms of similar shape came together, the finer being pushed outwards by the others which congregated in a mass at the center; and as the process continued, the central mass gained fresh atoms from the outside and kept losing the finer atoms from itself, until it formed a compact body like the earth. Other such masses were dried and ignited by the swiftness of their motion; they are the heavenly bodies.²⁰

There is no use attempting to evaluate the Atomist mechanics in terms of modern science, because the latter involves the concepts of mass and force, which were unknown to Leucippus and Democritus. And such an attempt would rest on a fundamental misconception of

²⁰ Diog., IX. 31 ff., *DFV*, p. 343. This passage is said to contain "certain Epicurean extracts from the *Great Diakosmos* (Burnet, p. 339), a book by Leucippus. cf. *DFV*, p. 347, par. 24; Usener, *Epicurea*, p. 37, 7, and frag. 308. This seems by no means certain, and even if it is true, the phraseology is admittedly Epicurean. In particular, the phrase *κατὰ ἀποτομὴν ἐκ τοῦ ἀπειρου* seems especially doubtful. Would *ἀποτομή* be the proper word for Leucippus to describe the natural and mechanical congregation of a certain number of atoms apart from the rest? And the atoms were supposedly *ἀπειροι* in number and shape, but would Leucippus have combined them into an *ἀπειρον*, a whole? What then is *τὸ ἀπειρον*? If we take the phrases of the passage literally, Leucippus would have started with an infinite whole composed of corporeal bodies on the one side, and a mighty void on the other side; then many of the bodies were cut off (by what?) from the infinite whole and borne away into the void to form worlds. This is just the sort of nonsense the Epicureans made of Atomism. Compare the very different statement of Democritus himself in frag. 167, *DFV*, p. 416. Democritus used *τὸ πᾶν* to signify shortly the indescribable condition of things at the beginning. Then Aristotle employed *τὸ πᾶν*, *τὸ ἀπειρον*, *πανσπερμία* loosely and sometimes misleadingly of the same condition. And the Epicureans in turn seem to have misinterpreted Aristotle to suit their own purposes.

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the Atomist system, which was not scientific in the sense of being formed by generalization from observed phenomena. A moment's reflection on the details will be enough to indicate the impossibility of arriving at them by means of observation and experiment; bodies which are too small to be perceived and yet have physical properties, and a void which exists but can by no means be demonstrated—these are certainly not the ideas that an actual experience of nature gives. Nor is there the slightest evidence that they were the final hypotheses considered necessary in order to explain newly discovered facts, for the Atomists adduced no new facts that had not been explained by the previous systems of cosmology. There is only one reason which could have led Leucippus and Democritus to propound a new theory of nature, and that was a belief that the current theories were logically untenable. This fresh theory was offered therefore as a better explanation of old facts, and its value in the minds of its authors must have rested on the logic of its explanation. This supposition is in keeping with the tradition which represents Atomism as primarily a logical reaction to Eleaticism; and such an interpretation, taken together with the backward character of the Atomist astronomy, suggests that this cosmology was not primarily based on scientific investigations.

5. Perhaps the most significant feature of Atomism is the way in which its authors explained the cosmological process without assuming new metaphysical or physical forces to produce the successive stages. We might analyze the account of Diogenes, though it presents certain difficulties of arrangement, as follows. Having started with atoms moving in a void, they had to deduce conglomerations of these atoms to form the celestial bodies; they did this by

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means of physical collision and entanglement, two purely mechanical causes inherent in the original nature of atoms. Having got conglomerations, they had to deduce rotation; this they did by means of interference, a mutually modified movement by contact, and again a purely mechanical causation. Having a rotating mass, they had to derive a qualitative distribution of atoms into the separate natural genera or elements; this they accomplished apparently by a sifting and localizing of physically similar atoms, in the course of which the finer were squeezed out through the interstices between the coarser which were then left in a spherical mass; this whole operation was again conceived as quite mechanical, being the result of resistance to pressure. Finally, having numbers of such bodies in motion, the Atomists had to account for the lighting up of some of them; this they effected by supposing that such bodies were dried up and ignited by the swiftness of their course through the air, which may possibly mean friction, but in any case is an operation as mechanically conditioned as the previous ones.

At each of these cosmological stages, a modern reader acquainted with the concepts of contemporary science may raise questions or objections. For example, have the Atomists, in allowing for changes of motion by collision, implied resilience, which is based on elasticity of materials, which in turn would suggest that an atom might at least temporarily become altered in form? Or again, in their account of the vortex, have they not overlooked centrifugal force, which is presumed to be present in all curvilinear motion? Or, finally, do they mean to employ weight as a physical circumstance in the selective process within the vortex, by means of which the larger atoms are brought to the center? Such interrogations, however, can be, as I have previously

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stated, but of momentary interest to us, for we cannot estimate the system of Leucippus and Democritus in the scales of modern science. What we can do is to admire the rational consistency of the cosmology as a whole. If we use the word "force" in its ancient Greek sense as a separate thing causing a particular movement, it would be true to say that the Atomists from beginning to end of their cosmology assume no new forces. At each stage of the process an action is set up by qualities in the atoms, which were present but latent from the beginning. A quality became operative and effective in a certain condition, that is, when put in conjunction with certain other qualities that were rendered effective by previous conditions. And every quality, condition, or cause was of the same physical and mechanical nature. Now since these causes could not have been observed producing these effects, they must have been used by analogy from known instances of similar character or else they must have been posited from known qualities of matter. The admirable consistency of the atomist system therefore rests in the end, first, on the fact that all its causes were of a uniformly physical character, that is, they were supposedly observed qualities of matter; and second, that all its movements were equally mechanically conditioned, that is, they were supposedly observed activities of matter.

6. If we ask why such a system as this is more satisfactory to us than that of Anaximenes, for example, or wherein lay the progress that had taken place in Greek philosophy since the first Ionians propounded their theories, we are likely to answer that Leucippus and Democritus stuck more carefully to observed facts.²¹ But on second thought

²¹ Gomperz, I, p. 352, speaks of "Democritus with his marked bias to empiricism," but that is wrongly phrased. There can be no doubt that

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such an answer obviously needs revision. Take the Atomist doctrine of atoms colliding, bunched, setting up a vortex, and regrouped mechanically into the natural elements like the sea; and lay it down by the side of Anaximenes' theory of Air condensing successively into cloud, water, earth, and stones. As explanations of a past unobserved process, both doctrines are equally theoretical and analogical. So far as the Atomist analogy had any basis of observed fact, this could hardly have been more than such ordinary phenomena as eddies of wind or water,²² and rivers running down into the sea; so far as Anaximenes had any similar basis, it must have been the familiar phenomena of evaporation, mists and alluvial deposits. It would be rash indeed to say that of these factual considerations that of the Atomists was more legitimate as a basis for analogy and generalization than that of Anaximenes; air in a sense does become cloud, and rivers do run into the sea. But if we could temporarily slough off our modern scientific information, it would be quite as difficult to imagine water as smoothly joined particles as to think of stones as condensed air. Moreover air was as corporeal, physical, and natural as atoms, indeed much more so, as the atoms could not be subjected to observation but were at that time merely logically necessitated entities. Furthermore the choice of air as the most real thing was probably made on grounds less metaphysical and more factual than the choice of atoms; Anaximenes could at least see clouds forming in the air, while Leucippus could not see atoms doing any-

Democritus surpassed most of his predecessors and contemporaries in wealth of knowledge, as Zeller says; but that does not make him an empiricist—indeed, his own doctrine was that sense experience was bastard knowledge. And it is impossible to show that his observations alone could have led to his cosmological doctrine. In general we would do well to read as few of our -isms into early Greek philosophy as possible.

²² cf. frags. 164, 167.

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thing. But the choice of both principles undoubtedly rested mainly, if not entirely, on logical grounds; Anaximenes' quantitative differentiation of the principle was more consistent and logically simpler than the forcing of opposite bodies into a whole, as Anaximander had done, and the Atomists were led to the invention of atoms by the logic of Parmenides and the criticism of Zeno. Again, the positing of one aboriginal thing or of an infinite number of aboriginal things must have been determined in either case by metaphysical bias; and with our philosophers holding the one position, and our scientists the other, he would be bold indeed who would attempt to judge between Anaximenes and Leucippus on that score. Furthermore, each successive stage of creation was equally corporeal and natural in both Anaximenes and the Atomists; from Air through the intermediate steps to stones, and from atoms moving as individuals to atoms moving as sea or trees, there was no place where an extraneous force (like Mind or Love) was needed. In either system, present change was the continuous result of movement which was a condition of the original thing or things, or, in modern terms, motion was a property of things for Anaximenes as well as for Democritus.

It is in the kind of movement or type of causation that the systems of Anaximenes and of the Atomists seem to differentiate themselves most patently to a modern mind, and that in two respects. First, the Milesian pictures creation as a series of transformations of an original substance, while the Atomists regarded it as continual rearrangement of original untransformed particles. Secondly, though neither system explained causation except to assert that the first body or bodies did actually move and kept on moving, yet the Atomists (with the exception

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of the original atomic movement) always provided a set of coexistent conditions from which, as a whole, succeeding events were produced, while Anaximenes had his principle change of its own motion without the influence of any external environment; in the latter, causation was spontaneous generation, in the former it was coexistence and sequence in external arrangement.

In both the first and the second of these points, our modern scientific theories again are stumbling blocks to a proper comparison of the ancient doctrines. Our chemists and physicists show us atoms and electrons arranged in different patterns in different materials, but they know of no transformations of one substance (except in certain radio-active elements) into a qualitatively different substance; hence we are drawn to Atomism by a kind of inevitable scientific affinity. Yet let us imagine ourselves as Plato hearing for the first time about the new theory from the North. We might ask if atoms were known to science, and we should find that scientists knew of no such thing; an atom, we should be informed, was a philosophical idea, invented to avoid the logical disaster of Eleaticism. But this mere lack of scientific verification would not distress us. Then as a matter of pure metaphysics, would there be any choice between an infinite number of material abstractions²³ gathering themselves into various objects, and a substance which changed itself into various objects? Probably as a metaphysician, and certainly as a logician, you would prefer the latter hypothesis, if anything.

²³ If they had been immaterial, Plato might have been interested in them. He had practically come to the conclusion, afterwards stated by Aristotle, that matter by itself cannot move; a cause of motion must therefore be of a higher nature than the things moved. Hence Plato would consider the possibility of Love and Strife (*Sophist*, 242 d), and of Nous (*Phaedo*, 97 c); but with materialism as such he will not even dally.

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Again, as regards the second point, the system of Democritus appeals to us because it seems to involve the modern notion of inertia; a Democritean atom did not change itself, but its circumstances were altered only from interference with other atoms. Yet the principle of inertia was never stated by the Atomists, and there is every reason to believe that Leucippus and Democritus knew nothing about it. If they made change a matter of interference from without, that was not due to any scientific discovery that a body tends to preserve its motion unless acted on by some external force, but simply to the fact that they commenced with a plurality of bodies, and since they did not assume any external force, they had to produce change by mutual interference. The appearance of scientific causality is therefore superficial and results solely from their pluralistic hypothesis. Both the system of Anaximenes and that of the Atomists were materialistic; but the former was monistic, the latter pluralistic. The former had to make change self-change of one body, because it had only one body to diversify; the latter had to make change interference of many bodies, because it had many bodies to concentrate in groups. Atomism attracts us in this respect because it has happened to be experimentally corroborated; but again if one were Plato and had no experimental verification of either theory, would there be any logical preference as between spontaneous generation and mutual interference, given the monistic or pluralistic hypothesis? No, I do not believe there was any more reason for Plato to be interested in the cosmology of Atomism than in the cosmology of Anaximenes;²⁴ nor do I believe that Leucippus "answered

²⁴ Plato never mentions Democritus. cf. Zeller, "Platos Mittheilungen über frühere und gleichzeitige Philosophen," *Archiv* V (1892). But it is very difficult to suppose that Plato did not know anything about Democri-

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the question of Thales" in a more satisfactory way than Anaximenes had done. In the present state of physical science, pluralistic materialism may be more in vogue than monistic materialism, but I should not say that materialism must necessarily be pluralistic. Indeed, with the latest electrical theory of matter and the difference between mass and energy approaching the vanishing point, there is a distinct possibility of a monistic natural science. But in any case, if the answer of Leucippus appears to us more complete than the answer of Anaximenes, it is so by reference to our present scientific theories,²⁵ and not because of any inherent logical superiority.

7. These general conceptions of Atomism, however, enabled its authors to make one very significant contribution to the general theory of nature, and that lay in their

tus. All the activity of Leucippus and at least most of Democritus' had passed before Plato founded the Academy; hence even if Leucippus did not found the school at Abdera but Democritus met him on his travels and brought the Atomist doctrine home, yet the school was probably established by Democritus before Plato founded the Academy; and in the forty years between that date and Plato's death, reports of the Atomist School must have come to Athens in the then state of travel and intercommunication (cf. the Athenian activity at Amphipolis nearby, and the presence in Athens of Protagoras from Democritus' own city, and of Aristotle from Stagira). But if Plato was acquainted with Atomism, that acquaintance by itself would be no compelling reason for his mentioning it in one of his Dialogues; he does not mention Anaximander, Anaximenes, Archelaus, or Diogenes of Apollonia, and he was not interested in the history of cosmological speculation. Certain specific doctrines of some of his predecessors did concern him as having a particular bearing on his own problems; but I have tried to show that the cosmology of Atomism need not have interested him and that his silence on the subject ought to cause no surprise. With regard to the ethical theory of Democritus, there is a possibility that Plato had it in mind in *Rep.* IX, 583 b, *Phileb.* 43 d, though several eminent authorities have denied this. But it is more remarkable that Aristotle, who knew the Atomist physics well, should have been absolutely silent on Atomist ethics. The truth seems to be that both Plato and Aristotle mention their predecessors only when it suits a particular purpose; and they (not we) must be the sole judges of that.

²⁵ When Professor Burnet (p. 349) says that the greatness of Leucippus "consisted in his having been the first to see how body must be regarded if we take it to be the ultimate reality," he is passing final judgment on early Greek philosophy from the present point of view of physical science.

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development of the idea of mechanical regularity. In the course of previous speculation, we have seen a succession of attempts to formulate the processes of nature in terms of nature alone, attempts to comprehend the natural as purely natural; and we have also seen how such efforts were frustrated by a fundamentally anthropomorphic point of view, an almost instinctive feeling that what has independent power of movement must in some way be intelligent and therefore supernatural. Empedocles had made a naturalistic system out of the four natural elements, and then had felt constrained to put on top of them the anthropomorphic figures of Love and Strife to set them in motion. Anaxagoras had reared a naturalistic structure and then had set over it a supernatural Mind. There had thus arisen a tendency to take intelligence out of nature and make for it a separate reality, a tendency that we noticed also in the Sophistic opposition between nature and law, and that culminated in the philosophy of Plato and Aristotle. But there was also an opposite tendency, which attempted to consolidate intelligence and nature. It would, I think, be true to say that early Ionian science, in spite of its endeavor to appreciate the natural, had only succeeded in assimilating natural activity to human intelligent activity. It might also be said that Philolaus had coordinated nature and intelligence in Harmony by means of a mathematical formula of all activity, including knowledge.

In the Atomists, we find the third possibility realized, that of assimilating intelligence to nature. We shall have to notice the Atomist view of soul later; it is necessary here only to say that their theory of mental activity was made to fit their theory of natural motion rather than vice versa. The absolute regularity observable in nature

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was expressed by Leucippus in the phrase: "No thing comes into being unnecessarily, but all things arise from a cause and by necessity"; and it may be admitted at once that this concept more or less successfully dominates the whole Atomist system. Its significance can best be brought out by comparing it with the idea of regularity in Anaximenes. There are two main points of contrast between them. In the first place, regularity is not *ex post facto* adjustment of a balance, a zig-zag whose median points are in a straight line; but it is a straight line of sequences with no possibility of deviation. In the second place, natural law is not a unitary compulsion exercised in spasmodic acts, or even a prescriptive power, such as is found in an imperfect form in Heraclitus and Parmenides; it is rather this latter concept developed by the omission of all human character into a blind universal necessity, operating spontaneously in every case. The law was not prescriptive but descriptive; the verbs of Atomism are normally in the past tense. Science was therefore the record of past or present events as necessarily conditioned and produced by preceding events. Now if we mean by Naturalism a doctrine that extends present scientific knowledge of the parts of the physical universe to the universe as a whole, and excludes from the whole whatever is not demonstrated in some part, then it would be true that Atomism was the first and only pure Naturalism in early Greek philosophy, because it was the only system that made the universe as mechanical as its physical parts are observed to be.

8. Let us now leave the Atomist cosmology and turn our attention to that part of the system which dealt with organic nature. And here we must first note that not only Democritus but also Leucippus was apparently interested

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in these problems, which had been increasingly prominent in philosophy. To Leucippus are attributed the doctrines that the objects of sense perception exist by convention (*νόμῳ*) and not by nature, and that perception occurs by means of effluent images from the objects perceived.²⁶ But it was Democritus who first developed a consistent humanistic side to the Atomist doctrine; and the fact that he did so is an indication that he was conscious of the same problems that confronted Socrates and that he belonged to the same period of philosophy.

Both Leucippus and Democritus approached the problem of soul from the normal Ionic point of view, holding that it was material like the rest of the world, and that it had the double capacity of knowing and causing motion.²⁷ Of course too on the Atomist cosmology, soul could not be an ultimate principle; each soul was, like everything else, a temporary collection of atoms. More specifically, it was the fiery atoms, which were probably regarded as smooth and round and fine so that they could penetrate all composite bodies. They existed not only in human beings but everywhere where there was warmth, especially in the air. They were the most mobile atoms and they caused movement by imparting their own motion.²⁸

Democritus was thus able to make a distinction between a human soul and a human body, but that distinction lies merely in the difference of material. Soul is as substantial as body, but may be distinguished from it by the quality of its substance. Furthermore the soul cannot be in any true sense an entity or even a unified principle, except

²⁶ Aet. IV. 9, 8, *DFV*, p. 349, 32 (cf. Burnet, p. 347); Aet. IV. 13, 1 and Alexander, *De Sensu*, 24, 14; 56, 12, *DFV*, p. 348, 29. All these statements probably come ultimately from Theophrastus.

²⁷ Arist., *De An.*, I. 2, 403 b 29; 405 a 8; I. 3, 406 b 15. The doctrine that the soul knows is not definitely ascribed to Leucippus.

²⁸ Arist., *De Respir.*, 4, 471 b 30, *DFV*, p. 370; *De An.*, I. 3, 406 b 15.

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insofar as atoms of the same kind obey the same mechanical laws. It was merely all the atoms of a particular quality, that are found in a particular body; such atoms, Democritus held, existed in all parts of the body, but were localized especially in the brain, heart, and liver. Hence in reality soul and body are merely abstractions; all we can say is that in any particular entity, the spherical fiery atoms may be considered together as soul, the rest as body. And the same might be affirmed of the world as a whole.²⁹

Let us frankly admit that we cannot think out the Democritean theory of the nature and functions of soul without becoming involved in grave difficulties which do not seem to have been felt by the author. It will perhaps facilitate our understanding of the theory if we interpret the soul as the principle of motion in the body, and consider its functions as various types of movement. This movement was generically the motion of certain atoms in the body; but atoms of this kind, probably just because of their extreme mobility, passed in and out of the body. Hence there was constant communication between a particular body and its environment by the coming and going of these atoms. This communication was effected in two ways, according as the atoms passed directly through the body or indirectly through special organs.

9. The most general function of soul lay in maintaining vitality. The motion of the soul atoms was communicated to the other atoms of the body, and thus produced organic activity. Life remained as long as there was a sufficient

²⁹ How far Democritus went with the idea of a world soul cannot be determined, as the only references to it are in late and untrustworthy doxographers. It appears that he did speak of gods, and in particular of Zeus as the "king of all" (frag. 30, *DFV*, p. 397; cf. frag. 2); but such figures must be regarded as mere personified abstractions for the purpose of conveying ethical doctrines.

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quantity of these fiery particles in the body, and this condition was maintained by the general influx of soul atoms through every part of the body, but especially by the organs of respiration. On account of the mobile character of these atoms, there was danger that they might be "squeezed out" of the body, in which event death would of course ensue; and it was the special function of respiration to introduce new, fresh psychic atoms from the air.³⁰

In regard to sensation or perception, the same principle holds. A presentation is formed by the atoms that come from the object to all parts of the percipient body; but the impression will not be felt unless there is a sufficient number of permeating atoms; and the function of the special organs or sense (if we may generalize from the description of sight and hearing, as given by Theophrastus) is to form passages for the transmission of these atoms in the proper quantity to the soul. Hence, though the sounding atoms, for example, penetrate through the whole body, we hear only with our ears. It is perhaps worth while to point out also that this theory embraces two notions which had influenced several predecessors of Democritus; namely, that all sensation depends on contact with emanations from without and is therefore reducible to a general tactile sense, and that the organs of sense must contain atoms similar in quality to those that cause the sensation, for like can only affect like.³¹

Democritus was very emphatic in distinguishing thought from sensation, and in asserting that only the former was true; but the exact physiological and psychological basis of this distinction has not come down to us, though we have some data which throw light on the

³⁰ See previous references.

³¹ Theo., *De Sensu*, 49-58, *DFV*, pp. 373, 374; Arist., *De Sensu*, 4. 442 a 29, *DFV*, p. 371.

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subject. In the first place, that which thinks in us is the same as that which perceives, namely, the soul.³² If then thought and sensation are activities or movements of the same organ, Democritus must differentiate them as processes. Now the inferiority of the senses arises from the fact that the images which are given off by all objects are distorted by the air, which is of course regarded as corporeal and which is constantly filled with emanations from all the objects in the environment. This explains the blurred vision of things at a great distance; if the intervening space was void, we could see an ant crawling on the sky.³³ Hence we have no true perceptions of external objects, because we do not perceive them directly, but only through the medium of a series of confused disturbances in the air. Such representations by the five senses give rise to a knowledge which is only opinion (*δόξις*); it is obscure, as if we were always looking at things in the dark (*σκοτή*) and could see only their vague configurations. When this twilight of opinion has exhausted its possibilities of definition, then comes true knowledge and shows us that the appearances of things are deceptive; in reality things are not what they seem, but only atoms and void.³⁴ If then the special organs of sense by their indirect processes give us false representations, and if the true knowledge is that in reality there are only atoms and void, then it seems probable that Democritus meant to oppose the indirect process of sensation to the direct contact of soul atoms with extraneous atoms. We have seen that he believed atoms from the outside were constantly permeating all parts of the body, and that the soul atoms, while localized

³² Arist., *De An.*, I. 2, 404 a 27, 405 a 5.

³³ Theo., *loc. cit.*, 50; Arist., *De An.*, I. 7, 419 a 15.

³⁴ frags. 6-11, *DFV*, pp. 388, 389.

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especially in the brain, heart, and liver, were not confined to these organs but existed everywhere in the body. It was possible, therefore, for atoms of the soul to be immediately affected by other atoms coming from outside.³⁵ If this interpretation of Democritus is correct, it means that he reduced knowledge, like perception, to physical contact—it depends, as it were, on the soul's sense of touch.

But here a new and at first rather surprising principle is introduced. Theophrastus says that, according to Democritus, rational thought (*τὸ φρονεῖν*) occurs when the soul is symmetrically constituted.³⁶ The text is uncertain, and the precise meaning of the passage is problematical; but that Democritus did say something of the sort seems to be confirmed by certain references in Aristotle, who affirms that he explained the phenomena of madness by the physical condition of the soul.³⁷ If the soul is disturbed, by heat or cold for instance, its movements may be so hampered that it does not judge well; and if it is harmed, as by a blow on the head, it may think wrongly, so that the person is said to be out of his senses. We may suppose that this doctrine of symmetrical blending (*κρᾶσις*) or harmonizing of material elements was an effect of the Pythagorean influence on Democritus, which is attested by other authorities;³⁸ but its significance for the atomist system is best explained in this way. Thought is a movement of the soul; a movement is occasioned by contact with other moving bodies, but the result of such contact depends also on the substance or internal condition of the body

³⁵ This explanation was put forward by Brandis (*Rhein Mus.* III, 139), rejected by Zeller (II, p. 916, n. 3), and has been recently restated by Burnet (*Gk. Phil.*, p. 198).

³⁶ *De Sensu* 58.

³⁷ *Met.*, IV, 5, 1009 b 28; *De An.*, I, 2, 404 a 27; cf. Iambl. *ap. Stob.*, *Ecl.* I, 880.

³⁸ cf. above, p. 198, n. 7.

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affected.³⁹ The principle is thus merely a general law of physics specially applied to the atoms of the soul, and our initial surprise is changed into admiration again at the consistency of the system.

It will be seen that Democritus was enabled to separate knowledge from sensation on the foregoing physiological grounds, and to make a valid distinction between the accuracy of the two processes. It seems likely that he was led to this distinction by attempting to combat the relativism of Protagoras, his fellow townsman. But after all, what does his theory of knowledge amount to? It amounts to the assertion that the soul can gain a true and definite knowledge of atoms and void in general, because our soul can apprehend them immediately as they are; but we cannot know any thing in particular, because we come in contact with it only through the senses, which are untrustworthy. It is true that we do not get much further than this with objects on the Kantian epistemology; but Kant understood the use of the understanding to build up a body of knowledge in conjunction with the senses. Democritus, without any such logical experience and strictly limited by his materialistic hypothesis to mechanical processes and physical objects, could perhaps do something, but not much, to combat the contemporary scepticism by showing the possibility of knowing atoms and void.

10. Nor is it surprising that, when he turns to the theory of conduct, he should not define the highest good in clear-cut terms of knowledge, but should rather return to the material of the soul and in its proper constitution find the *summum bonum*. Yet even here we are disappointed to discover no definite psychological or materialistic basis for his ethical doctrine. He appears to be content with

³⁹ cf. frag. 9, *DFV*, p. 388, κατὰ σώματος διαθήκην.

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the assertion that happiness or unhappiness rests with the soul, and is not a matter of bodily pleasure,⁴⁰ but he probably also thought of it as that condition in which the movements of the soul are not violent but moderate and harmonious.⁴¹ How such a condition is to be differentiated from that symmetrical state of the soul which is a prerequisite of clear knowledge, or whether Democritus thought of them as the same thing, we can only guess for ourselves.

It will be necessary to preface a further consideration of Democritus' ethical views by a brief account of the general characteristics of his method and his writings. In the first place, a great many works on all sorts of topics were attributed to him, some of which without doubt came from different members of his School; and at this date it is impossible to determine which are his own. There does seem to be some reason for attributing to him, in the ethical field, the treatise entitled *περὶ εὐθυμίας*, *On Cheerfulness*; and probably also he brought out a collection of moral maxims or aphorisms (*ὑπομνημάτων ἠθικῶν, ὑποθήκαι*).⁴² That means that certainly some of the fragments which have come down to us under his name are, as they appear to be, "isolated observations and precepts, which are indeed connected by the same moral temper and mode of thought, but not by definite scientific conceptions."⁴³ And in these writings the ethical thought of Democritus

⁴⁰ frags. 159, 171, 187, *DIV*, pp. 413, 416, 417.

⁴¹ frag. 191, *DFV*, p. 420. cf. frag. 72, where immoderate desires are said to blind the soul; these desires must be interpreted also as movements of the soul. Also frag. 33, where instruction is said to "change the rhythm" of the soul. Stob. II. 7, 3, *DFV*, p. 383, says that Democritus used the word *ἀραξαίλα*.

⁴² These statements are made on grounds of probability only. Both the works mentioned above are given in the Tetralogies of Thrasyllus, but that is no guaranty. They were accepted by Lortzing (*Ueb. d. Eth. Frag. Demokrits*), and Burnet (*Gk. Phil.* I, p. 199) accepts the former.

⁴³ Zeller, II, p. 935.

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is on a level with that of Heraclitus—reflective but unsystematic. But on the other hand, if we accept the discourse *On Cheerfulness*, it is natural to suppose that it was a connected treatise with some logical development, in contrast to the book of unconnected maxims; and when we turn to the extant fragments, there are a few which seem to have formed part of a larger connected work, and at least one (191 *DFV*) is long enough to contain a logical sequence. These indications, therefore, point to a stage of ethical thought somewhat more advanced than that of Heraclitus and evincing the rudiments of comprehensive treatment. Hence we must suppose that the ethical views of Democritus were developed with a certain logical consistency, though probably not to the same high degree as is manifested in his cosmological works, which had the benefit of a longer tradition behind them. But if there was any such consistency, then we may legitimately try to recreate it from the extant fragments for purposes of interpretation, either because these fragments are really broken pieces of an originally comprehensive expression, or because they are maxims isolated merely in expression but promulgated from the same consistent system of thought. We shall accordingly proceed to do this, without implying either that the present condition of the remains will enable us to reproduce the original completely or that the original itself was perfectly systematized.

We have already noticed that Democritus made happiness a quality of the soul and not of the body. In words that have a Socratic reminiscence, he says: "It is meet for men to take account of soul rather than of body; for perfection of soul corrects wretchedness of the bodily tabernacle, but bodily strength without reasoning makes the

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soul not a whit better.”⁴⁴ And there are many other passages in which the weaknesses of the flesh are thrown into unfavorable contrast with the powers and excellence of the soul.⁴⁵ Indeed, the opposition between the two is occasionally developed almost to a dichotomy which in language resembles Pythagorean mysticism and which in fact ill consists with the physical and physiological doctrines of Atomism. Yet there can be no doubt about the general proposition that Democritus thought of human well-being as dependent upon the soul.

Furthermore he is equally emphatic that this well-being rests entirely with the individual. “The gods of old gave and still give to men all good things; but whatever is evil and harmful and useless, these things they neither gave nor give, but men themselves walk into such through the blindness and foolishness of their mind.”⁴⁶ External objects bring us evil or good according to our use of them.⁴⁷ Happiness or unhappiness is thus the result of our own free choice.⁴⁸ “Men have fashioned an image of Luck to excuse their own thoughtlessness; for Luck rarely opposes wisdom, and keen-sighted intelligence sets most things straight in life.”⁴⁹ Hence in this aspect, goodness is practically equivalent to intelligence, as the faculty of discernment; and there are many fragments in which the special qualities of intelligence, such as wisdom, cleverness, understanding, reason, are virtually synonymous with excellence of soul.⁵⁰ We can therefore understand

⁴⁴ frag. 187, *DFV*, p. 419.

⁴⁵ frags. 37, 40, 57, 105, 159, 189.

⁴⁶ frag. 175; cf., however, frag. 269.

⁴⁷ frags. 172, 173.

⁴⁸ αἰρεόμενος, frag. 37; ἐθέλειν, frag. 62; βουλομένῳ, frag. 173.

⁴⁹ frag. 119.

⁵⁰ frags. 31, 77, 105, 181, 197, 200, 247.

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the very misleading interpretation of Aristotle that for Democritus soul and mind were the same thing.⁵¹

That such is not the case becomes abundantly apparent when we inquire more closely what Democritus meant by happiness, for we are left in no uncertainty that he identified it with pleasure.⁵² It was of course not bodily pleasure but a kind of unruffled cheerfulness of spirit; and the real function of the intelligence was apparently to determine ways of producing this condition. "Fools live without enjoyment of life," for "wisdom frees the soul of its ills."⁵³ It looks as if Democritus had no appreciation of wisdom on ethical grounds—no vision of a philosophical pursuit of knowledge—for all his protestations against bastard wisdom; certainly there is no clear enunciation of such a principle, while there are many phrases which suggest that the mind, as the organ of knowledge, was useful insofar as it subserved the general end of pleasure. Intelligence and discernment enable one to choose the good instead of the evil beforehand, and to turn evil into good afterwards.⁵⁴ But even so, we must acknowledge that Democritus, by putting happiness in the soul and by mixing with it such a large element of wisdom, has certainly and successfully avoided what Professor Burnet dubs a "vulgar Hedonism."

This is made even more evident by the principle of moderation which Democritus introduced into his doc-

⁵¹ *De An.*, I. 2, 404 a 27.

⁵² *τερψιλή* and *εὐθυμία* are the most usual words; Stob. II. 7, 3, *DFV*, p. 383, says that Democritus also used *εὐεστῶ*, *ἁρμονία*, *συμμετρία*, *ἀταραξία*, some of which occur in the fragments.

⁵³ frags. 200, 31. The full form of the latter is: "Medicine heals diseases of the body, but wisdom frees the soul of its ills." This may be a prosaic adaptation of the Pythagorean doctrine: medicine to purge the body and music to purge the soul.

⁵⁴ frags. 58, 66, 76, 173.

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trine of happiness. "Cheerfulness (happiness) comes to men through moderation in pleasure and harmony of life"; both excess and deficiency are bad.⁵⁵ This seems to be a general law, governing not only pleasure but also desires and indeed the whole conduct of life; it proceeded therefore from an attitude of mind or an ethical quality of the intelligence. It was the idea of many elements harmonized into a consistent whole by compromise between extremes, applied first to the concept of human existence, and then more specifically to that of pleasure; and as such, it represented the best traditions of Greek life and thought, that were taken up into all the noblest of their philosophies. In Democritus, as in the great Athenian thinkers, it gave rise to the virtue of *σωφροσύνη*,⁵⁶ a complex quality characteristic of a sound or normal mind in the enjoyment of every object only so far as is consistent with its own total activity. But in the Atomist system, this moderation in conduct is quite certainly based on the psychological doctrine that every act of consciousness (this seems the only way to put it) is a movement of the soul; hence the greater these movements are, the less does the soul enjoy that state of equipoised stability in its motion, which was the physical condition of happiness.

Perhaps a translation of the longest extant fragment (191), which probably comes from the book *On Cheerfulness*, will now prove helpful in understanding the ethical position of Democritus. It is as follows: "For cheerfulness comes to men by moderation in pleasure and symmetry of life. But what falls short or is excessive is likely to change suddenly and to cause great movements

⁵⁵ frags. 70, 72, 102, 191, 233-5, 286.

⁵⁶ frags. 208, 210, 211, 291, 294.

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in the soul; and souls that are moved through great intervals (i.e. from one extreme to the other, violently) are neither stable nor cheerful. So then men ought to keep their thoughts on what is possible and to satisfy themselves with what they have, taking small notice of envied and admired things and not attending to these in their thoughts. You should rather observe the lives of the afflicted and consider earnestly their sufferings, in order that your present circumstances may appear great and commendable in your eyes, and that your soul may no longer be distressed by desire for more. For if a person admires and keeps his thoughts all the day on those who have possessions and who are esteemed fortunate by their fellows, he is compelled ever to strive after something new and to turn his desires toward doing one of those irreparable deeds which the laws forbid. Therefore it is necessary not to seek after some things but to be cheerful with other things, and, comparing your life with those who are worse off, to count yourself happy, seeing what they suffer and how much better you live than they. By holding fast to this idea, you will live more cheerfully, and in your life you will repel not a few evil spirits—envy, and jealousy, and ill-will.”

11. Let us now attempt to examine these ethical views more critically. In the first place, there is undoubtedly a putative connection between them and the physical doctrines, which might be represented in its simplest form thus: cheerfulness = stable, harmonious condition of soul = stable, harmonious movement of soul atoms. It is of course idle to speculate whether Democritus or Epicurus or some one else could not have reached the conception of spiritual calm and stability without the Atomist physics; on the evidence at hand, there seems small reason to doubt

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that this ideal, which was to wield so large an influence in the history of ethics, was actually due in the first instance to Democritus' conception of the natural state of a composite body whose parts are mechanically related, and to his materialistic notion of soul. Again, his doctrine of pleasure was probably influenced by his physical point of view. There is a very significant fragment in which he says that "the boundary between the useful and the injurious is pleasure and pain," and we are told that he said this often.⁵⁷ Hence pleasure is to be regarded as the feeling which characterizes the natural state of sentient body; and it was mechanically conditioned, as shown by the doctrine of moderation or harmonious movement. It is therefore probably true that most of the fundamental features of Atomist ethics were logically and consistently connected with the physical theories of the same system.

There are, however, many ideas among these ethical doctrines which cannot have had any such connection. It is hard to see, for example, how the superiority of the soul over the body could be deduced from the principles of Atomist physics, or even be justified on these principles; surely the mobility of certain atoms is no more useful to them or the world at large than the stability of other atoms, and least of all in a field where stability is a desideratum, as it is in the soul. The physical properties of soul atoms do indeed enable them to penetrate everywhere and so make intelligence possible; but their mobility was a consequence of these physical properties and was therefore their natural condition, so that stability would be an unnatural ideal forced upon them. And again, even if this mobility produces intelligence, how can intelligence be considered a superior thing on the principles of Atomism?

⁵⁷ frag. 188; cf. frag. 4.

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On the other hand, the Pythagorean terms in which this whole doctrine is frequently couched make it extremely likely that it was a borrowed idea which Democritus incorporated among his ethical views. Furthermore such notions as the value of justice, friendship, cooperation, etc., must have come from a consideration of social life and human conduct in and by itself without regard to the laws of physics. They are similar to ideas which were rife in intellectual circles at the time, and they were of such a general application that they could easily be adapted to fit any philosophical system. We must therefore conclude that there were two sources for the ethics of Democritus—his own materialistic cosmology and the general current of reflective morality—and that sometimes the author took an idea from the latter which did not fit the former.

It remains for us to examine Democritus' ability to make distinctions and to work with abstract conceptions. And here we must first notice Aristotle's judgment that Democritus was one of the pioneers in the employment of definitions and the conception of essential natures.⁵⁸ But the only express premise given for this conclusion is "a sort of definition of the hot and the cold," and it is impossible to discover among the extant fragments of Democritus any such definition. Now if we compare these fragments with those of Parmenides, we find that the latter go far ahead of the former in the abstraction of qualities from sensible phenomena. We have already noted the admirable consistency of the Atomist system of causation, but there is not the slightest evidence that this resulted from any superior notion of the formal cause

⁵⁸ Aristotle uses these phrases in connection with this ability of Democritus: τὸ τί ἦν εἶναι, εἶδος, ὁρίσασθαι, *De Part. An.*, I. 1, 642 a 24; *Met.*, XIII. 4, 1078 b 20; *Phys.*, II. 2. 194 a 81. And in some of these passages Democritus is associated with the Pythagoreans or Empedocles, but not with Parmenides.

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—indeed, how could there be any formal cause in the philosophy of Democritus, except Necessity? And this figure of Necessity is not a formula; it might be classed as a form or law expressive of the essential nature of the world, but only in the vaguest sense and without any attempt at definition. The uniformity of the Atomist system is best explained negatively, that is, as the refusal to interpolate among concrete phenomena others of a different kind; but that seems to be due to a firm disbelief in any other kind of things, rather than to a conception of the form or idea of Necessity. Furthermore, in the ethical field, Democritus evinces no high degree of intellectual capacity in penetrating to the essential nature of moral and mental activities. Most of his statements describe an action but do not distinguish an essential quality. For example, “justice is to do what is right; injustice is not to do what is right, but to turn aside from it” (frag. 256)—a form of expression that reminds us of Polemarchus and his level of ethical intelligence. You cannot define justice by infinitives. No attempt is made to define mind, wisdom, happiness, cheerfulness, pleasure, or to distinguish a bodily organ, an activity, a quality, and a condition. Hence we simply cannot tell how far through his ethical doctrine there was a consistent relation with his materialistic principles. We can agree with Zeller⁵⁹ that Democritus “did not inquire into the nature of moral activity generally,” if we understand “the nature of moral activity” to mean its essential nature as determined by definitions. But on the other hand, we must in justice admit that Democritus did inquire into moral activity generally, and that he was the first cosmologist to do so. He, no less than Socrates, recognized that the mental and moral nature of man furnished a prob-

⁵⁹ II, p. 935.

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lem which philosophy could not ignore; and perhaps he understood the relation such an inquiry must bear to the whole of philosophy even better than his great Athenian contemporary. His great inferiority to the latter lies in the comparative weakness of his logical equipment, in explanation of which we may hazard the guess that, in attempting to refute the Eleatics, he did not appreciate his debt to them.

PART TWO

THE DEVELOPMENT OF GREEK PHILOSOPHY
TO THE TIME OF PLATO

CHAPTER I

THE FIRST AND SECOND PERIODS OF GREEK PHILOSOPHY

A RETROSPECT over the general course of Greek philosophy is perhaps as instructive and necessary as an examination of the individual systems of thought, for in this way we can best gain a critical understanding of its historical development and cultural significance. To this end we may mark the gradual acquisition of data, discern the progress in methods, compare the main tendencies of the several periods, and endeavor to assess the meaning of the whole.

We are met at the outset with the problem of differentiating what is traditionally known as cosmology from the thought that preceded and followed it. This is merely a particular instance of the general problem of historical periods, for the rise of cosmology is commonly considered to inaugurate a new period, which in turn was brought to a close by the humanistic emphasis of the Socratic Age. We thus group together certain contiguous events into a period, and distinguish them as a whole from an earlier and a later group. The distinguishing feature is usually a tendency, and a period of history is therefore ordinarily conceived as a portion of past time within which a particular tendency was predominant. The very study of history, when properly understood, is based on the supposition that tendencies of the past may be disentangled

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from the web and woof of events through which they worked, and isolated for comparison and present appreciation. But a natural and almost inevitable result of this procedure is that it often becomes more engrossed in separating a period from its antecedent than in understanding the connection between the two; for the human mind is so constituted that it delights in clear-cut definitions. Yet it should not be necessary to remind an age so thoroughly imbued with evolutionary doctrine as our own that any period must to a large extent be conditioned by its precursor, that what is new in it must be extremely small as compared to what is old, and that it cannot be adequately represented by stressing its peculiarities to the exclusion of those features which have been handed on to it. A truer method of approach is gained by recalling that a period is in reality an abstraction of the historian for purposes of his own. The same extent of time may be differently divided by different historians, especially if they are interested in different aspects of existence; for a span of years distinguished by some new political tendency, like the impulse to colonize or to federate, may not be marked by any particular ethical or scientific traits, for example. Historical analysis is and must be to a certain extent subjective.

For the historian of philosophy, the actual data are the thoughts of individual human beings. These individuals received from others who were before them certain ideas, points of view, background and physical environment, all of which were bound to be factors in any new intellectual activity. Now an historical tendency is simply a conscious agreement among contemporaneous individuals to regard a particular set of facts in a particular way. But no individual and no group of individuals can ever change the

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whole of life—there seems to be in intellectual activity a law of limited expansion, so that at any one time we can go so far and no further. The progress of today is finally stopped by hindrances that will have disappeared or be easily overcome tomorrow. Hence, in our mental existence, we live mostly on the past, and a new tendency means no more than an advance along one of many continuous lines. Such advances are constantly being made, but the historian selects that one which he believes most important, and regards the duration of its ascendancy as a period. Yet it is obvious that a period, which by one new tendency is distinguished from its predecessor, is indistinguishable from it in a thousand other ways.

It is the received opinion that philosophy began with Thales, and that is a convenient and sufficient summary for minds that take satisfaction in such summaries. But it should not suggest that previous to Thales no one had wondered about the operation of the world and the meaning of human life or had ventured to explain these problems. Nor should it be taken to signify the discovery or invention of a wholly new system of thought, that completely filled the minds of its adherents so that nothing of the traditional point of view remained. The presocratic period did contain a new tendency which distinguished it from all that had gone before; but that tendency again was simply a new idea which was accepted by certain individuals, which existed in their minds by the side of countless old notions, and which was itself moulded by all this mental equipment in the midst of which it originated. There is no sense in cutting off Cosmology from the previous Mythology and Cosmogony with any legislative finality. The Greeks had long been curious; they had of old tried to explain nature to themselves; and the Milesians

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were only continuing and developing an ancient practice.

How the old point of view and the old expressions worked to qualify the new idea, I have attempted to explain in the first sections of Part I. We are now concerned in the attempt to discover and define the new tendency, which makes us group together the thinkers from Thales to Leucippus into a period. What was it that distinguished this period from the earlier ages? It was not that men ceased "telling tales," for in a sense they did not cease; the Milesians exercised their ever-lively imagination on rain and wind, as their ancestors had done. It was not that they stopped inventing myths about the origin of things and tried to explain what things are now; the mythologers had explained what things are and the Milesians attempted to describe the origin of things. It was not that they gave up gods as causes, for they still had gods and their gods were the only causes of movement which they knew. It is true that these philosophic gods were conceived quite differently from the mythological gods; the fanciful and whimsical deities of poetry were discarded, and the personal characteristics of the popular gods of nature became submerged in the natural elements. Instead of a god in some indefinable way transcending his element, the element now was god. But on the other hand, the element gained certain characteristics which had before been attributes of the god, such as life, ability to beget offspring, and in some cases knowledge. Now such a notion could hardly have been arrived at without some antecedent disturbance of traditional ideas—it must have been an effect, not the cause, of a change.

What was really new seems to have been the development and combination of several old tendencies. In the first place, the earliest philosophers became interested in

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nature for its own sake. Of course, people had been interested in nature before this; the poets, especially Hesiod, had manifested more or less curiosity about natural processes, and others, such as sailors and magi, doubtless concerned themselves to some degree with physical phenomena. But in all such cases interest in nature was secondary and subservient to another main purpose, while in the philosophers it was itself the main motive. Theirs was the sustained curiosity from which science springs.

In the second place, they investigated nature. Investigation is a general term whose meaning depends upon its application; but it is the right word to describe the work of the first philosophers. Their methods, as one would expect, appear to have been mainly those of direct observation, but the keenness of their curiosity very soon led them also to make experiments. Their inquiry was not limited by the hypothetical boundaries of particular sciences and disciplines, for these did not then exist; and though it seems likely that their attention was turned chiefly to celestial phenomena and the great natural elements, yet it was certainly not confined to this field, but was attracted to many objects and processes throughout the whole realm of nature. Now it would certainly be impossible to prove, and it is most unlikely, that no one had investigated nature before this, especially if we use investigation in the broad sense that has been specified. It would be perfectly possible, for instance, to maintain that Hesiod had done this. But the investigation of the earliest philosophers seems to imply a consistent distinction of the sensible materials of nature from all separate invisible and mythological forces frequently imagined to be behind it. These men were content to work with what they could see or thought

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they could see, and that is the first requisite of scientific method.

In the third place, they tried to explain nature. Here again they were obviously not the first, but their explanations differed from the previous ones in stopping with the connection between observed phenomena. Before this, an explanation seems to have explained only by referring a visible object to an invisible agent; but it now became mainly a matter of regular relationship between two equally visible phenomena. In other words, the explanations of the first philosophers were made in terms of regular natural sequences, which form the paramount subject-matter of science.

The conjunction of these three tendencies, namely, sustained curiosity or desire for knowledge, investigation of material objects by observation, and explanation by means of regular connections between phenomena, produces the essence of what we know as natural science. They are, as it were, the beginning, middle, and end, or the motive, method and product of natural science. Hence what was really new and what distinguishes the work of Thales and his successors from all that had gone before was the presence of a scientific point of view, the essence of which was an appreciation of regularity in the working of the material world.

If exception be taken to such a statement on the ground that we are discussing philosophy rather than science, I must reply that this objection implies a separation between the two which is belied by the very history of them, which we have just considered. The province of philosophy is fortunately not confined within narrow bounds, but includes any inquiry into the real or ultimate nature of the world; and the investigation of the earliest Greek

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thinkers certainly was such an inquiry. More precisely, their doctrines may be analyzed into a structure of theory and generalization built upon a foundation of sensuous observation. Whether this should be called philosophy or science or should be divided between them is a matter of small moment; it is commonly classed under philosophy and I see no valid reason to modify the arrangement.

The really important point which is brought out by the objection we are debating is that what we call philosophy originated in scientific investigation. The same impulse that drove Thales and his successors to observe the processes of their material environment drove them also to explanations of these processes; and early Greek philosophy as a whole was marked by this close connection between what we term natural science, and what we term philosophy, the characteristic product of which is known as Cosmology. The point, however, is a purely historical one, and should not by itself lead to the assumption that philosophy cannot exist except upon the solid foundations of natural science; that would be to overlook another historical point, and an equally important one, namely, that this same early Greek philosophy included the doctrines of the Eleatic School, some of which were not based on natural science but rather denied its possibility. This fact would appear to constitute an exception to the statement that the tendency which distinguishes the presocratic period is essentially the scientific impulse; and in a sense that is true. The purely metaphysical doctrines of the Eleatics do stand aside from the main current of the period, and may be thought of as the first germ of the logical investigations of the next. Yet even here we can see that our principal statement is correct, for Parmenides, the founder of the Eleatic School, after fashion-

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ing his metaphysical system, recognized the predominant philosophical tendency of his age by developing another system based on natural science. Hence we may rest satisfied with the generalization that the tendency which distinguishes the presocratic period of Greek philosophy was the scientific inquiry into the natural world.

It is usually agreed that this first period came to its close with the advent of the Sophists and Socrates; and a new period, called the Socratic, was thereby inaugurated in the course of Greek philosophy. This will mean that the natural scientific tendency, which had been predominant, lost some of its force so that it no longer impressed philosophic inquiry strongly, and a new tendency arose which so modified the thought of subsequent investigators that their doctrines may be classed together and distinguished as a whole from the preceding group. It is well to remember, however, that the old tendency did not die, for even after Socrates had turned philosophy into new channels, there were thinkers, like Diogenes of Apollonia, who still followed the old quest; and after the first rush of enthusiasm with the fresh problems wore off, the master-figures of the period, Plato, Democritus, and Aristotle, took up again the old question of the material constitution of the world. It is well to remember also that the new tendency came into being while the old interest in nature was still predominant; for we have seen that Empedocles, Anaxagoras, Philolaus and Leucippus, to say nothing of many minor characters, were the philosophic thinkers of the time when the earliest Sophists and Socrates began their work. The new, therefore, existed side by side with the old, the one gaining, the other losing, ascendancy; and it is impossible to fix a year for the boundary between them, for temporally they overlap. Perhaps we might go so far

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as to say that the new tendency had already become predominant by the opening of the last quarter of the fifth century B.C.

Let us now ask exactly what this new tendency was. That it had to do with mankind, as contrasted with the physical world in which the main interest of the previous inquiry had lain, we have already noticed, and this much seems to be admitted by all historians. But we want to isolate it, so to speak, and define its essential character. We shall find that this tendency, like that which ushered in the previous period, was a development and a combination of several old ones. In the first place, the apostles of the new order raised the problem of knowledge. This was a subject which in one form or another had already engaged the attention of philosophers, as we have seen. Since the time of Xenophanes, at least, most of the cosmologists had asserted a distinction between mere opinion and truth; and some of them, like Empedocles, had constructed theories on the nature of sensation and thought. But all such inquiries had been subsidiary to the main problem of discovering the reality of the natural world; and the authors were seemingly led to examine the matter either in order to suggest that their own doctrine was true while that of previous writers was mere opinion, or to show how the principles of their cosmology operated in that part of the world which exists in the form of human animals. But in the Socratic age, the possibility of knowing anything was assailed, and thereby the very life of philosophy was brought into jeopardy, so that the epistemological problem became one of the first subjects of investigation and was discussed on its own merits. Moreover it inevitably induced the question of the nature and validity of the processes of pure thought or reason. The separation of

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this logical problem from the foregoing epistemological one is difficult and perhaps impossible in the end, and this is not the place to discuss it; but we can differentiate them sufficiently for our present purpose by understanding epistemology to be an inquiry into the process by which the mind as subject is presented with objects, and logic an inquiry into the process by which the mind manipulates its presentations. Now logical considerations had been introduced by Parmenides and employed to a large extent by Zeno, an older contemporary of Socrates, though usually classed in the presocratic period. But the addition of the logical to the epistemological problem was an increasingly prominent trait of the later period. These inquiries, with many secondary ramifications, such as those concerning the nature of speech or the emotions, form various aspects of the general subject of the human mind; and we may therefore group them together as psychological in the literal sense of the term.

In the second place, the philosophers of this period took up the serious study of human existence. Here again the way had been prepared by the cosmologists, most, if not all, of whom had related the life of man in some way to the supreme life of the world. Indeed it is probable both inherently and from the expressions of the individual authors that they believed an understanding of nature implied a proper way of living or at least a correct view of man's existence. But whereas the method of these early thinkers had been to investigate the essential property of the world and from this draw the necessary implications for human beings, their successors in the following period studied mankind *per se* and tried to determine its inherent constitution. In so doing, they discussed for the first time the real problem of ethics, and raised it to the position of

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a principal subject in philosophy. Moreover, the new psychological data seemed to suggest that a person was not so much a certain quantity of matter controlled by the laws of nature as a psychic entity influenced and impressed by others of its kind; and hence these same thinkers were led to believe that the life of a single soul depended less upon its connection with the material world than upon the organized group of persons with whom it was thrown. And this reflective attitude accorded well with the traditions and practices of Greek society, in which the corporation normally ranked above its members. So when human life became a subject of conscious interest, it was bound to include a question as to the nature and the best condition of the social group; and as the unit of organization at the time was the city-state or *polis*, the discussion of this question was called politics. Many of the chief thinkers in the previous period had been more or less practically and prominently identified with political affairs, and a few had formulated brief doctrines, like that of Heraclitus on "what is common." But the joining of the ethical and the political problems, and the serious theoretical investigation of them was a characteristic feature of the Socratic period. To probably all the writers of this period these two lines of inquiry, the ethical and the political, would be only different aspects of the same general subject, which would be thought of as the good life or living well. We can remember, for instance, that Plato in his search for justice was compelled to found a city for it, and that the conclusion of Aristotle's *Nicomachean Ethics* was also the preface to his work on Politics. But since that day the two topics have lost this intimate connection, and the English language has no convenient term to cover them both.

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From the Greek point of view there were thus two tendencies that distinguish the Socratic period of philosophy: the logico-epistemological and the ethico-political, which developed from germs that were created philosophically in the preceding period. The essential theme of the former was knowledge, of the latter, conduct. They were both concerned with the life of man, and they had of course many common points, the specific nature of which depended on the doctrine of individual thinkers; for example, the ethical treatises of Plato and Aristotle consider the theoretic life, which presupposes knowledge, and Socrates identified goodness with knowledge. Nevertheless they remained two different fields of investigation—or perhaps it would be better to say that they became more and more independent of each other as the period advanced.

This conscious division of philosophy into departments was a formal characteristic of the Socratic period. I should hardly call it a tendency—it was not substantial enough to affect the views of any authors. But it is worth noticing by way of contrast with the earlier speculation. The cosmologists had set about investigating nature and they made no distinctions between the various manifestations of the material principle; even human nature was still nature. But the Sophistic age discovered that there was a principle in man which could not be demonstrated elsewhere in the world; sometimes they thought of it concretely as custom or legal establishments, and sometimes abstractly as intelligence. Moreover the Sophists propagated a utilitarian spirit, which tended to enhance consideration of the practical aspect of the intelligence and to heighten the contrast between this and the apparently useless investigation of nature. Hence the Socratic period

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started the first rift in philosophy by setting nature aside and inquiring into the life of man. But even that topic proved too large to be handled as a whole by systematic thinkers; perhaps we may say that Plato attempted it in the *Republic*, but if he did, the publication of his later logical Dialogues must be taken as evidence of his conviction that human life could not be compressed within the compass of a single work. It seems probable that Democritus also divided his labors into several distinct fields or subjects, and of course that was the method followed by Aristotle. But meanwhile the subjects handled by cosmology had been taken up again into philosophy, though they also had had to be grouped into separate departments, such as physics and astronomy. And thus at the end of the Socratic period, we notice first that philosophy had been thoroughly departmentalized, and secondly that philosophy still included what we think of as science.

CHAPTER II
SCIENTIFIC FOUNDATIONS OF
COSMOLOGY

THE predominant tendency of the first period in Greek philosophy has been defined as the impulse to investigate and explain natural regularities; and we have also found that these inquiries were not divided into separate sections. Hence we should expect that, while particular authors might be exceptionally attracted to particular phases of nature, and all of them might concentrate their energies chiefly on an aspect of the world in which regularity was most obvious, yet they would manifest an eagerness to uncover similar secrets in all features of their environment. In other words, there ought to be a far greater scientific activity than could be guessed by one who limits his interests to their philosophical theories. And that is precisely what surprises us when we leave the histories of philosophy, and dig about in the literary remains and traditions of the period or turn to the histories of the various sciences.

We do these early thinkers a grave injustice if we imagine that their theories about the ultimate constitution of the world were mere primitive speculations, fabricated by people who were cursed to an unusual degree with idle curiosity and who turned their myth-making fancy to illegitimate uses in scientific fields. On the contrary, there lay behind the doctrines that reach up into the region of

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philosophy a great substructure of careful observation and patient research, which is frequently overlooked. Quite recently much of this has been brought to light by various scholars, and it seems worthwhile to summarize their results as briefly as possible, both in order to get a better picture of the men whose views we have been studying and also in order to mark the progressive accumulation of data which influenced philosophy.

At the outset it is well to recall once more that the habit of accurate observation had been a Greek characteristic long before there was anything worthy the name of Greek science. Even in Homer we can see an instinct for realistic description of nature that is foreign to the oriental literatures, and the same impulse is more apparent in Hesiod. Moreover the remains of early Greek art, especially a series of vases from the seventh and sixth centuries B.C., exhibit a minuteness of anatomical observation and an accuracy of rendering animal forms that are lacking in Babylonian and Egyptian art. All this simply means that the Greeks as a race were given to noticing with attentiveness the objects of their environment, and that they would therefore store up a wealth of detailed knowledge. But such knowledge is not what we mean by science, and it could not become science as long as nature was believed to be ruled by powers whose actions could never be predicted. No matter how much astronomical lore was available, there could be no astronomy while people supposed that the sun-god might decide at any time to hide his face or to leave his course. Nor could "the accurate portrayal of a lion's dentition, the correct numbering of a fish's scales or the close study of the lie of the feathers on the head, and the pads on the feet, of a bird of prey" lead to biology, if one supposed that species might be con-

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founded by the production of centaurs, satyrs and other unnatural monstrosities. Science is based upon the presupposition of a regular, uniform nature, so that any particular phenomenon may be regarded as typical of its class, and generalization becomes possible. It was just this appreciation of the regularity of the world and the consequent possibility of generalization that is found in the work of Thales and his successors, and that started Greek science on its way.

We also have to remember that undoubtedly the earliest Greek scientists drew on the learning stored up in the ancient civilizations of Babylon and Egypt; and specifically it seems probable that their debt to these foreign centers of culture consisted in the Babylonian astronomical cycles and the Egyptian art of mensuration. Now such data imply some degree of generalization; the Babylonian priests were in the habit of predicting eclipses on the basis of their records, and the Egyptian surveyors could set up right angles or find the area of fields anywhere by general methods. But the purpose of all this knowledge was practical, and therefore the knowledge itself did not advance beyond practical needs. But what we think of as science does not depend on a bread-and-butter impulse, and is not limited to the demands of business. It springs from a desire to know, whether the knowledge shall be capable of being put to extraneous uses or not. And this is what differentiates the Greek contributions in this field from those of other ancient civilizations, for they first manifested this purpose to know the nature of the world. In a sense it makes little difference whether we grant or refuse the title of science to the Egyptian and Babylonian achievements, for that is a matter of words. It is, however, legitimate to point out that these early accomplishments

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in the valleys of the Nile and the Euphrates were not followed by fruitful results and never grew into systems of knowledge. And we do need to remember that mankind is indebted to the Greeks alone for developing, stating and exercising that single motive to intellectual understanding, which has formed the essence of science.

In this connection there is one further general point which ought to be considered before we take up the scientific accomplishments of the early Greek philosophers, and it is this; does science, as we think of it, necessarily include knowledge of causes? Now it is obvious that pure mathematics does not deal with causes at all; but the physical sciences always attempt to discover the causes of any facts of which they take cognizance. The geologist not only learns all he can about earthquakes, for example, but he also endeavors to discover the conditions that produce them. The chemist investigates the properties of crystals, but a part of his investigation is an inquiry into the atomic arrangements by which crystals are formed. In other words, the physical scientist finds that causation is a uniformity of nature, which it is his professed business to investigate. A known causation thus becomes a fact, which can be stated in general terms, like any other fact which is within the purview of the science. But in generalizing, the natural scientist has found it possible to express a large number of facts, processes, relations, etc., in mathematical formulae. This can take place only when the data have been thoroughly investigated and the variations of objects under different conditions have been reduced to the form of invariable sequences. Hence physics, which is the oldest of these sciences and to which exact computations were applied as early as Pythagoras, is probably the most mathematical; chemistry less so; and biology, the

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newest, is least mathematical of all. Now the highly developed state of physics, both terrestrial and celestial, at the present day sometimes makes it difficult for us to appreciate the scientific character of the early contributions to the subject, so halting, so partial, and even so replete with positive error do they seem to us. Yet we should be on our guard against giving way to such a feeling, lest we fall into the mistake of supposing our present science to be final. Scientists do not claim to know the whole truth about nature, and they are always ready to accept corrections of their theories, when confronted with new evidence. Science is a progress of knowledge, and the fact that one stage is superseded by another should not lead the latter to deny the title of science to the former. It would be as absurd for us from our superior Copernican vantage ground to delete the name of Ptolemy from the honor roll of astronomy as it would have been for Ptolemy to do the same for Pythagoras. But unless we arrogate to ourselves the pretension of perfect truth, we have no right to oust from science those who did not know what we know or think we know. Hence we cannot insist that Thales should have understood the "true" cause of eclipses if he is to have a place in astronomy, or that Empedocles should have recognized the same nature of sensation as is received by modern physiology. What we do expect in a scientist is an attempt to determine causes as well as other natural uniformities at the instigation of an impulse to know the world.

We have now briefly compared Ionian science with previous Greek knowledge of the world, with contemporary oriental knowledge of the world, and with our modern scientific knowledge, and we can summarize our conclusions as follows. Into the composition of this early sci-

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ence, apart from a certain content of facts, there went two fundamental elements. The first was the discovery of natural regularity, which implied an order running through the entire world, so that a fact was not an isolated thing but a piece of a uniform whole, and thus itself a uniformity that could be stated in general terms true yesterday, today, and tomorrow. The second condition was the desire to use such facts to obtain further facts, entirely apart from the question whether they were immediately practical or not, but simply for the purpose of gaining knowledge. These are the impelling factors whose particular manifestations we shall now attempt to follow in the various authors with the understanding that the deficiency of their results as compared with present knowledge shall not occasion impatience at their efforts to comprehend the true nature of the world.

Thales' most famous scientific achievement was his prediction of an eclipse of the sun. We have previously concluded that the historical evidence for this prediction is sufficiently strong to warrant our acceptance of it. But there is little to justify the supposition that Thales understood the true nature or cause of eclipses; and his prediction was probably based on Babylonian astronomical periods. There is some plausibility in attributing to Thales also the discovery of the inequality of the four astronomical seasons as determined by the solstices and the equinoxes; but we cannot feel sure about that. Thales also busied himself with geometrical problems, the data for which he probably learned from the Egyptians; but he quite certainly advanced beyond the empirical rules, which he would learn in Egypt, and the general methods which he adopted were in reality the beginning of scientific geometry. Exactly what these methods were or what

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form the geometrical discoveries of Thales took, it is now impossible to determine. Certain feats of measurement, such as determining the distance of ships at sea, were attributed to him by tradition, and Eudemus, a pupil of Aristotle, who wrote a history of geometry, supposed that he knew the propositions which would seem to be involved in the solution of these problems. Although it is almost certain that Thales did not enunciate these theorems in the form in which they existed at the time of Eudemus, yet I see no good reason to doubt that the tradition on which Eudemus worked was substantially correct. We may accordingly assume that Thales worked out problems in which these elementary propositions were implied and thus originated general methods, without stating the propositions in the general terms which later became usual. The following are the theorems attributed to him: (1) that a circle is bisected by its diameter, (2) that the angles at the base of an isosceles triangle are similar (archaic for "equal"), (3) that if two straight lines cut one another, the vertically opposite angles are equal, (4) that if two triangles have two angles and one side respectively equal, the triangles are equal in every respect. There were other astronomical and geometrical achievements ascribed to Thales, but they rest on even more untrustworthy evidence than the foregoing, and we shall not delay over them. Those we have already noticed are enough to indicate that Thales employed general methods and was a man of science in our sense of the word.

The name of Anaximander, like that of his predecessor, is associated with certain practical inventions. He is credited by some authors with having discovered the gnomon, a vertical post set in a horizontal plane, used for determining the solstices and equinoxes; it is, however,

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most unlikely that Anaximander invented this instrument, though it is possible that he made improvements on it and adapted it to other uses, such as telling the time of day. There is much more plausibility in the tradition that Anaximander constructed the first map of the earth; and Hecateus is said to have corrected this map. But the scientific achievements of the second Milesian thinker were chiefly concerned with astronomy, and in this field he showed himself an original thinker of the first order. In particular, his theory that the earth swings free in the center of the world, held in its place by "its equal distance from everything" marks an enormous advance over traditional ideas, and is even far superior to the theories of his fellow Ionian scientists. Now it has been suggested that this doctrine, as well as several other points in the cosmology of Anaximander, can be explained on the analogy of eddies of wind and water, in which heavy bodies tend toward the center and light ones toward the circumference; and this explanation seems to me the only satisfactory one. If we accept it, we must consider Anaximander to have been a keen observer of natural processes, and an exceptionally keen analytical thinker. He must have first carefully watched the effects of eddies; he must have then been able to formulate the mechanical principles in some general fashion; and he must finally have transferred these principles analogically to his concept of the world as a vortex. Surely that is no mean achievement for the second scientist. But such a picture is borne out by his other theories, such as those concerning the circular nature of the heavenly bodies and their relative sizes. Moreover, Anaximander was evidently interested in discovering why things act as they do. He was not satisfied with description; he wanted to find causes, and in this also we can see

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the true scientific impulse. For in his attempt to assign the cause of eclipses, of the moon's phases, of thunder and lightning, we can see that he uses his doctrines of what the heavenly bodies are. In other words, the questions how they act now, what they are, and how they came to be what they are, were inseparable aspects of one fundamentally naturalistic point of view.

Anaximander also developed a remarkable biological theory, the chief points of which are as follows: "Living creatures arose from the moist element as it was evaporated by the sun. Originally man was born from animals of another species; for, while other animals quickly find food by themselves, man alone requires a long period of suckling, and hence would never have survived if he had originally been as he is now. The first human beings arose in the inside of fishes and were reared like sharks." In interpreting such a startling theory, we are apt to jump at conclusions; but we ought to be on our guard against this, and especially so when there is a similar modern theory, which can be used to fill in the gaps or be read between the lines of the ancient one. This means in the present instance that we cannot attribute to Anaximander the theory of evolution, which arose in the last century and which is based on perfectly definite evidence that was quite unknown to the ancient Greeks; but it does not mean that we cannot attempt to compare particular doctrines of ancient thinkers with particular items in modern theories. Pursuing such a policy, we notice in the biological theory given above the suggestion of a development of animal species. This is in line with Anaximander's general belief in a growing nature, a process by which an original body gradually developed through successive differentiations into qualitatively distinct species. Again there is the

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hint that man cannot represent the original type of animal owing to the difficulties of his early nurture. This means that man must be the result or end of a development of species, and in this development Anaximander evidently believed that environing conditions played a large part. Hence the earliest beings must have been at least capable of meeting the difficulties of their environment, which suggested the manner in which certain sharks nourish and protect their young. This last point is a highly significant one for our present purpose, for it indicates the scientific inquisitiveness with which he pursued his investigations.

Anaximenes appears to have been of quite a different type from his predecessors. No practical inventions can be attributed to him, and he does not seem to have been an original investigator to any appreciable degree. He was a thinker, a systematizer of theories, and we can best imagine him as engrossed in the task of making the doctrines of his School consistent. In other words, there was now an institution and a body of knowledge, and Anaximenes is to be regarded as the head of this organization, confronted with the need of consolidating its tenets. And this position, if we may hazard a mere guess, accorded with his natural disposition. He did, to be sure, originate theories on the nature and movement of the celestial bodies, such as that the earth, sun, and moon, being flat, float on the air like leaves—an idea which probably came also from eddies of wind; he did too speculate on the causes of celestial phenomena, which he referred back through successive stages to a unified organic principle imagined after the analogy of an individual soul. But we feel that all such theories at bottom are not so much the result of his own personal observations as of a logical quality of mind, arranging and systematizing previous

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data. Nor should we minimize the scientific character of such work, for science certainly grows by such processes as well as by the accumulation of facts. The best example of this tendency in Anaximenes in his theory of rarefaction and condensation. Anaximander had held that the opposite bodies, known as the hot and the cold, had originally been parts of one Boundless whole from which they had been separated out. But such a doctrine, when thought about clearly, involves certain difficulties; if the opposite bodies were already contained in the Boundless, then how could the Boundless be a whole, a unity? And if they were created in the process of separating out, would not the process be more than mere separation? Accordingly, Anaximenes adopted the view that the original mass differentiated itself quantitatively in two directions, and the opposite bodies in the old sense gave place to opposite processes. So the one substance could be left and its apparently different forms could be explained as mere differences of density, that is, of amount. This theory is obviously an immense improvement on the old Milesian doctrine, and as Professor Burnet remarks, it makes that doctrine consistent for the first time. Surely it is beside the point to argue that modern chemistry knows of no such transformations as Anaximenes supposed and therefore his differences of density really do imply differences of quality. We may say, if we choose, that such changes cannot be purely quantitative but must be regarded as tropic; but that is to judge Anaximenes on the basis of our present scientific ignorance. The tendency of science, whether we look to Anaximenes or to the modern electron-theory, is to reduce all differences in things to differences of amount, capable of numerical specification; and it is surely a remarkable tribute to the Greek intellect that this

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tendency was observed so early in the course of its scientific inquiry. We must admit that Anaximenes' theory has not yet been experimentally verified; but neither has Anaximander's theory that there are eternal, irreducible qualities. And meanwhile science is proceeding on the method of Anaximenes. His position therefore is the first concrete illustration, in a series that is constantly lengthening, of the immense service rendered to science by the sheer logical imagination.

No one did more, or perhaps as much, for Greek science as Pythagoras; and yet it is impossible to ascribe any particular scientific discovery to him with certitude. He founded a society that carried the burning torch of scientific curiosity and investigation through two centuries and then handed it on to the Academy. But such were the social regulations of the Order that we do not know the contributions of particular members, or even the precise influence which the Order as a whole exercised on the culture of Greece, although the indications are that it was very great. Under these circumstances we can do no more than exhibit the scientific achievements which may with some plausibility be referred either to Pythagoras himself or to the Order in the early years of its history. These fall under four modern disciplines: mathematics, geometry, harmonics, and astronomy.

It seems clear that the earliest Pythagoreans took up the study of numbers and founded the science of arithmetic. But that discipline was not exactly what is embraced under the same name today. It was, in the first place, a pure theory of numbers and did not include practical problems in calculation, which at least in Plato's day, formed the subject matter of another discipline called logistic. But, secondly, the numbers envisaged by the Pythago-

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reans were apparently things or actually existing objects, probably conceived as geometrical figures somewhat after the patterns of the dots on dice. Hence the Pythagorean theory of numbers was neither practical nor abstract in the modern sense; it was geometrical. It seems to have considered numbers, first in their serial progression (unit, tetraktys, etc.), secondly in their numerical composition (odd, even, prime, etc.), and thirdly in their geometrical form (triangular, oblong, etc.).

The last of these aspects immediately suggests the close connection that always obtained in the Pythagorean Order between arithmetic and geometry. A moment's reflection will show that this relationship would tend to impede progress in the former but not in the latter; and it was in fact in geometry that the Pythagoreans rendered their most fruitful and enduring service to Greek science. In the geometrical conception of numbers (as well as in the cosmological application of the number doctrine), the notions of pure number, shape, and size tend to coalesce; and therefore in the study of numbers the Pythagoreans were naturally led into comparisons of areas. For this purpose they apparently superimposed the smaller square (or triangle or oblong) directly on the larger, and then studied the remainder. Hence arose problems of applying to small figures additional areas in order to produce larger figures of the same type (triangular, square, oblong); the increment was called the gnomon of the smaller figure, and it is easy to see that in each type of figure there would be a regular series of gnomons. It is evident that this method of comparing areas might be extended to all sorts of geometrical problems, of which one of the most obvious would be that of applying to a line an area of given specifications; and in fact the "application of areas" be-

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came a well-known Pythagorean construction, utilized in many different geometrical theorems and later extended to conic sections, where it produced the conceptions of parabola (application), hyperbola (exceeding), and ellipse (deficiency, falling short). The most famous Pythagorean proposition, which may well be attributed to Pythagoras himself, was that, if you apply square figures to the sides of a right triangle, the square on the hypotenuse is equal in area to the sum of the squares on the other two sides. We do not know how this proposition was originally proved, but it is unlikely to have been by the demonstration given in Euclid I, 47.

Problems of this character would suggest also the question of commensurability and it seems likely that Pythagoras and the early members of the Order devoted some attention to such matters, though it is impossible to determine how far they proceeded. Another closely allied topic was proportion, and it is probable that Pythagoras himself either discovered or introduced into Greece the three means, arithmetical, geometrical, and sub-contrary or harmonic. The last of these is connected with Pythagoras' discovery of the numerical ratios between the four fixed notes on the lyre, which was one of his greatest contributions to Greek science.

In astronomy his scientific genius was also manifested, for he was the first to assert the sphericity of the earth, though he still adhered to the geocentric hypothesis. Furthermore, there is some evidence that Pythagoras noticed the independent movement of the planets, and therefore distinguished between the diurnal rotation from east to west and the slow movement through the signs of the zodiac from west to east.

In this brief sketch of the work of Pythagoras I have

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not given a half of the achievements that are uncritically ascribed to him by later Greek authors; and yet it must be patent that even if no more than half of what I have seen fit to refer to him were really his, he would still rank as one of the world's greatest scientific geniuses.

Of Xenophanes there is little to say in the present connection, except that he was not a scientist at all; he was a poet, theologian, and reformer, and the cosmological ideas which are contained in his *Satires* are probably adaptations of Ionian science. Heraclitus too cannot be called a scientist, in the strict sense, although he had the same faculty of logical imagination which marked the thought of Anaximenes. But this statement raises the question why we class Heraclitus as a philosopher and not as a scientist; and it is but the complement of the same question if we ask why we rank Anaximenes as a scientist and refuse the title to Heraclitus. Now of course, the boundary between science and philosophy, if there is any such, is, like that between literature and philosophy, an ill-defined and shadowy one; and the more definite it is made, the more arbitrary does it seem. Yet in practice we recognize a valid distinction between the two; and it will be proper for us to develop briefly the contrast between Anaximenes and Heraclitus, as illustrative of this distinction. The scope of the problem is narrowed by two facts; first, that neither of these thinkers was to any appreciable extent a first-hand investigator of phenomena; and second, that phenomena appear in the system of each of them as that which is given and which is to be explained. But it is here, in the field of phenomena, that we can first discern a difference between the two thinkers; for while the data of Anaximenes are all physical and material, those of Heraclitus embrace also human experience in all

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its variety—thoughts, feelings, actions. I am far from asserting that Anaximenes consciously excluded facts of this kind, or that Heraclitus recognized the full import of including them; for I do not believe that to be true. The only point to which I am drawing attention is that the Ephesian took cognizance of human experience while the Milesian did not. It is, of course, problematic how far human experience is amenable to scientific treatment, though we have certainly made some progress in that direction since the days of Heraclitus. Yet probably in the main this subject is still considered as belonging more to the province of philosophy than to that of science. And this raises a second point of dissimilarity, namely, that the latter of these thinkers was led to attempt an evaluation of the elements of experience, which is entirely lacking in his scientific predecessor. When he says, for example, "It is not good for men to get all that they wish. Sickness makes health pleasant; evil, good; hunger, abundance; weariness, rest," he is using his general cosmological doctrine to establish a theory of values; and that is within the province of philosophy, but not of science. Hence we may say that Heraclitus—it is only less obviously true of Xenophanes—was primarily a philosopher because he included human experience itself among his data and because he tried to work out a scale of human values. Similar considerations *mutatis mutandis* would suggest that Anaximenes was preeminently a scientist, and that Pythagoras was both scientist and philosopher. Incidentally, such an arrangement would make Pythagoras the first philosopher, and this accords with the tradition which ascribes the term to him. Finally, we ought to acknowledge that this distinction between science and philosophy could not have been sensed by these Greek

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thinkers whom we have been examining, and the mere classification of their systems would be an item too minute to warrant our delaying over it, if it did not exhibit the significant expansion of the field of intellectual interest and the emergence of what we think of as philosophy out of what we think of as science.

If Heraclitus was primarily not a scientist, Parmenides in *The Way of Truth* was not a scientist at all, because he did not even include among his data the physical phenomena which form the subject matter of science. He is here a pure philosopher. But this is not the case with *The Way of Opinion*, which is the ordinary cosmological science. Unfortunately the fragments of this treatise are too scanty to permit us to determine with any pretense of accuracy how much of a scientist its author was. But it is possible to affirm at least that in astronomy and in physiology (which was then developing out of medicine) Parmenides was either an original observer or else in touch with the latest observations. We are especially interested in his doctrine that the organ of thought is "the substance of the limbs" (*μελέων φύσις*) and that the character of thought is determined by the mixture of elements in the body. This interest in the mechanics of thought is new, and agrees with several other indications that physiological problems were invading the traditional province of cosmology.

Real progress along these lines was made by Alcmeon, who was also intimately connected with the Pythagorean society. He was in fact the founder of empirical psychology and there is some evidence that he practised dissection. He put forth the view that the brain was the organ of intelligence, a view which Hippocrates and Plato later adopted, while Empedocles and Aristotle adhered to the

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older doctrine that the heart is the central organ of thought. This subsequent divergence of opinion shows that, if Alcmeon did practise dissection, he did not carry it to the point of distinguishing nerves from blood vessels. Nevertheless he believed that the peripheral organs of sense were connected with the brain by some kind of passages, and he investigated each of the special senses in a systematic way. Moreover he distinguished sense-perception from understanding or intelligence; and though he has left no explicit indication as to how he would differentiate them, the word which he uses for the latter (*ξυνήσι*) suggests the notion of synthesis as the characteristic of intelligence. Alcmeon did not confine his inquiries to the special field of physiological psychology; but his views on health, the soul, and the heavenly bodies show that here he was in the main content to adopt older doctrines. His pupils, Acron and Pausanias, carried on his anatomical researches, so that he is to be regarded not merely as an original contributor to science, but also as having given inspiration to a new method which lived after him and continued to exert its influence on later generations.

Greek science received another great impetus in the work of Empedocles. His influence was perhaps most potent on the development of biological knowledge, but his scientific achievements were by no means limited to that field. In astronomy he put forth many interesting and original hypotheses, most of which, however, were of little lasting value. But he had adopted the true explanation of solar eclipses and of the moon's light, which were the great discoveries of his age; and he was aware that the darkness of night was not an exhalation but the shadow of the earth. Probably his most important achievement in

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this field was his theory that light travels and takes time to pass from one point to another. But it was in medicine and biology that Empedocles made his greatest contributions to science. He was the founder of the Sicilian School of medicine, which Galen ranks with those of Cos and Cnidus, and his medical theories profoundly affected subsequent philosophy. In the combination of exceptionally keen observation and brilliant analogical reasoning, Empedocles approached so near the experimental method that it is difficult to deny that he used it (frags. 84, 100); but it cannot be proved that he tried to control and vary the factors or elements of the objects which he investigated, and that seems to be the essence of this method as now understood. It would take too long to catalog his various biological doctrines and that is not necessary for our present purpose. We ought, however, to notice that he believed in the evolution of animals and clearly set forth the principle of the survival of the fittest; but his doctrine of evolution is totally different from the modern theory in being largely based on direct mechanical control exercised by cosmological forces. Empedocles also investigated the five senses and attempted to differentiate thought and sensation. He believed that all bodies are composed of the four elements, earth, air, fire, and water, and that we perceive each of these elements by means of the same element in us. He thus originated the doctrine that like perceives like. All bodies send off images or emanations, and all bodies have pores or passages which receive the emanations from without; but the special organs of sense are fitted with pores of particular kinds, which receive only emanations which are symmetrical with them. Empedocles distinguished thought and sensation in evidential value, but he localized thought chiefly

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in the blood around the heart and failed to make any clear psychological basis for the distinction between it and sensation.

Anaxagoras was credited by many ancient authors with the discovery that the moon shines by the reflected light of the sun, and the weight of this testimony is so great that it is difficult to refuse credence to it. On the other hand, the fact was stated by Parmenides and by Empedocles, and that alone makes it practically impossible to attribute the discovery to Anaxagoras. Perhaps the most likely hypothesis is that the Pythagoreans actually originated the idea, and that Anaxagoras was the first to expound it at Athens. He also explained the phases of the moon and eclipses, giving a fairly satisfactory account of these phenomena except that, as causes of lunar eclipses, he assumed dark bodies "below the moon" as well as the earth, possibly on the ground that occasionally the eclipsed moon had been observed while the sun was still above the horizon. But Anaxagoras adhered to the old notion of a flat earth, and in most of his astronomy he followed Anaximenes. His cosmology was based on the vortical principle, and to this he seems to have made one fruitful contribution in noticing the centrifugal tendency. He did not formulate the fact in general terms, and there appear to be inconsistencies in the application of the idea; but in fact he recognized both a concentration and a tendency of bodies to move away from the center of a vortex. Anaxagoras also probably knew some mathematics, and it is likely that his doctrine of divisibility proceeded from a consideration of the same problems with which Zeno dealt; but how much of a mathematician he was, our evidence does not permit us to judge. He is represented by Plutarch as engaged in the squaring of the

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circle, a problem which on other evidence appears to have been popular during the latter part of the century; and Anaxagoras is the first whose name was associated with it. In biological science, his general principle that "there is a portion of everything in everything, except Mind, and there are some things in which Mind is also" was the first attempt to formulate the distinction between animate and inanimate nature. He held that there was Mind in plants and animals as well as in man, and that it was all the same; it produced different results or different levels of activity only in virtue of the bodily structures in which it resided. Anaxagoras also investigated the senses and developed a theory of perception, in which he opposed Empedocles, holding that it was the effect of contrary upon contrary.

Oenopides of Chios was famed as a geometer, and two propositions in the First Book of Euclid are attributed to him by Proclus; but his reputation cannot have been due merely to these simple theorems, and it seems likely that what he really did was to introduce into Ionia the more highly developed geometry of the Pythagoreans. He was also an astronomer, and was credited by Eudemus with discovering "the cincture of the zodiac circle," which may mean the obliquity of the ecliptic.

The arguments of Zeno, with their profound implications for the notion of continuity, space, time and motion, deserve notice in a review of Greek science. That their full import was not appreciated by most of the Greek scientists is plain. But it is not clear just how much they meant even to their author.

Diogenes of Apollonia, although constructing a cosmology in pursuance of the old Ionic tradition, was primarily interested in physiology. His elaborate account of

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the veins has been preserved by Aristotle, and he is further remarkable as being the first to discuss memory and reminiscence. He also worked out explanations of the five senses and of sleep in accordance with his general cosmological position.

Meton of Athens was an astronomer whose greatest achievement was the cycle of nineteen years. His problem was to bring the calendar into conformity with solar and lunar phenomena; and it is said that, while the mean tropic year on his calculations was 30 minutes 11 seconds too long, the mean lunar month ascertained on the basis of his figures is wrong by not quite 1 minute 54 seconds.

Hippias of Elis, the Sophist, invented a curve known as the *quadratrix*, which was used for trisecting any rectilineal angle and possibly for finding the length of any arc of a circle. The importance of this curve lies in the fact that it took geometry beyond what were called "plane" problems which could be solved by ruler and compass, that is, problems dealing with the straight line and the circle. Antiphon, another Sophist, worked on the squaring of the circle by means of inscribing in it a series of regular polygons, each of which has twice as many sides as the preceding. As directed toward the specific purpose of squaring the circle, the method involved a fallacy so obvious that Aristotle would not deign to refute it; but the method *per se* was useful in developing the theory of approximation and exhaustion.

Hippocrates of Chios was, so far as is known, the first to compile a book of Elements, and he was also the author of several important geometrical theorems. He was famous for his work on two great problems, the squaring of lunes (intended to serve as a preliminary for the squaring of the circle), and the doubling of the cube. He suc-

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ceeded in squaring three particular kinds of lunes, and he reduced the doubling of the cube to the problem of finding two mean proportionals in continued proportion. But the chief importance of Hippocrates for the general history of science lies in the fact that he was the first to compile a book of geometrical Elements; and the real import of that service should not be obscured by his particular contributions to the subject matter or by the greater genius of his successor, Euclid. For the book of Hippocrates means that geometry was establishing itself as a separate discipline, independent of philosophy, the first deductive science to maintain a distinct existence of its own.

The extant evidence for the thought of Leucippus and Democritus is unfortunately so meager and untrustworthy as to permit only the most tentative conclusions as to their scientific achievements. There was a tradition in antiquity to the effect that Democritus was a good scientist, and titles of his reputed works on all sorts of scientific subjects have been preserved. On the other hand, there are several points that militate against such a conception of him. In the first place, I have tried to show elsewhere that the real greatness of Atomism lay in its logical consistency rather than in any notable contributions to natural knowledge. And this interpretation is confirmed by the little astronomy that may with some probability be referred to Leucippus and Democritus, for it is of a relatively reactionary character and reminds us of the early Ionians. Again the works attributed to Democritus were apparently the corpus of the Treatises produced by members of his School, and by the time these were subjected to anything like critical examination, the opportunity for distinguishing their authors had passed. Furthermore, while the great originality of the founders of Atomism may have been

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conceptual, yet the naturalistic bias of the whole doctrine would have led in the direction of direct investigation of phenomena and so have produced real scientific contributions from later members of the School. Hence we must at least suspect the tradition of Democritus' extraordinary scientific versatility, while admitting that it may still be true.

If the surmise that Leucippus was the real author of the conception of atoms was correct, then doubtless to him is due the credit for the simplicity and consistency of the theory; and certainly those qualities are to be esteemed *desiderata* of science in his case as in that of Anaximenes. Furthermore, it is likely that Leucippus had investigated sensation and adopted the notion of effluent images from objects to account for it. With regard to Democritus, we may be said to know that he worked out theories of sight, hearing, taste, and touch, that these theories rested on the view that like affects like, and that they were ultimately based on the general mechanical principle of contact, which underlay the whole Atomist position. We are also, I believe, justified in assuming that Democritus was a mathematician of no mean rank. Archimedes attributed to him the propositions that a cone is one-third of the cylinder, and a pyramid one-third of the prism, which has the same base and equal height. Also a fragment has been preserved in which Democritus deals with a specific case of the problem of spacial continuity. Finally it is certain that he concerned himself with all kinds of astronomical phenomena, and Gomperz has made him appear as depositing in principle the geocentric hypothesis and in general anticipating modern cosmology. Suffice it to say that the historical evidence at our disposal does not warrant such an extravagant picture and that, so far as the evidence

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does go, it suggests an astronomy of retrograde rather than brilliant character.

The work of the Coan medical School constitutes one of the chief glories of Greek science, but again reliable information regarding it is scanty. According to tradition, it came into great prominence towards the close of the fifth century B.C. under the influence of Hippocrates. Plato speaks of him as a great physician and teacher of medicine, and the tone of Plato's remarks agrees with the tradition that Hippocrates was the outstanding figure in medicine at the time. His prestige was such that the medical treatises produced by members of the School were attributed to him; and these now form what is known as the Hippocratic Corpus. This is a collection of about seventy separate works on a wide variety of medical topics; and it shows unmistakable evidences of having been produced over a considerable length of time by authors with highly diversified points of view. Most of it is probably to be dated later than the lifetime of Hippocrates, but there are several treatises which may be referred on internal indications to the period when he was active, and it seems likely that some of these (though we cannot say which) were by his own hand. The main tendency of the best works of this collection was in the direction of freeing medicine from philosophy and religious superstition; and Celsus asserts that this separation was the contribution of Hippocrates himself. Such a view is not controverted by Plato's statement that according to Hippocrates it is impossible to understand the body without a comprehension of its whole nature; for Plato proceeds to say that what Hippocrates meant by the whole nature of anything was its natural powers and organization. The point is made clearer in Chapter xx of the Hippocratic treatise *On Ancient Medi-*

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cine, where we read that a physician must have a knowledge of nature but that the only way to gain such knowledge is by a complete investigation of the body. Now such a procedure is what we mean by the inductive method, and we can see this method actually employed in the record of cases which have been preserved as part of the Corpus. These reveal a patient observation of details, an attempt to distinguish characteristic from accidental symptoms, and a generalization of the characteristic features. It is true that any system of medical treatment in its largest aspect seems to presuppose some theory of causation, and such theory, based ultimately on the distribution of the four elements (earth, air, fire and water) in the body, is not lacking in the Hippocratic library. But in the best works of the series it amounts to no more than a working hypothesis, which in no way interferes with further investigation. Hence we may conclude that the testimony of Plato, the general statements of method in the best works of the Corpus itself, and the actual results of that method as found in the same works combine to indicate that the Coan physicians at this period had adopted the inductive method and by so doing raised medicine into the position of an independent natural science.

It is clear that some of the Pythagoreans of Plato's time still preserved the scientific traditions of their Order and were themselves engaged in original investigations; but all Pythagorean science was bound up with philosophy to such an extent that it is practically impossible to determine where the one leaves off and the other begins. The attitude of the Order is well illustrated in the following sentence of Archytas, a contemporary of Plato: "Those who deal with mathematical subjects have, I think, shown an excellent understanding of them, and it is not at all

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surprising that they have a proper conception of the nature of individual things; because, having shown an excellent understanding of the nature of the whole, they were bound to have an insight into the nature of the parts." Here knowledge of the universe is virtually regarded as a prior condition of the knowledge of individual objects! It goes without saying that such a program could not be carried out in practice, but the statement illustrates the basic confusion that reigned in Pythagorean circles. The wonder is that members of the Order ever made any contributions to science at all; but they not only did that, they also seem to have constituted a continuous influence for investigation as long as the Order lasted. We shall need to notice in particular the work of two individuals, who were active before Plato founded the Academy, Philolaus and Archytas.

On the basis of the fragments previously accepted, Philolaus does not appear as an arithmetician or geometer (though he uses numbers in a cosmological sense), and we have no other evidence that he was. According to later writers, however, he was something of an astronomer, and he is credited with one theory that was undoubtedly of importance. This was the notion that the earth was not in the center of the world, that place being occupied by a central fire which is not the sun and which is invisible to us on account of our position. Round this nuclear fire revolve ten bodies, an antichthon or counter-earth, the earth, moon, sun, etc. The idea that the earth might not be in the center of the world and that it might be a planet was entirely novel in Greek astronomical doctrine, and though the particular theory of Philolaus did not prove correct, yet it was bound to suggest the possibility of explanations which would "save" more phenomena than the geocentric

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hypothesis did. From still a different source we know that Philolaus was the originator of certain medical doctrines, but these are not important enough to detain us.

Archytas of Taras or Tarentum was a friend of Plato and a man of many accomplishments. He is said to have developed mechanics on mathematical lines, and he was a geometer of considerable ability. He solved the problem of finding two mean proportionals in continued proportion, and thus also the problem of doubling the cube (see above under Hippocrates of Chios). He also wrote on music, defining the numerical ratios between the notes of the tetrachord; but we do not know how much of his work on this subject was original and how much represented the traditional knowledge of the Order. Finally in one of his fragments we have the first indication that geometry, arithmetic, astronomy, and music were conceived as "sister" mathematical sciences, an arrangement which probably influenced Plato in drawing up his program of studies for the higher education of the Guardians in Book VII of the *Republic*.

Theodorus of Cyrene was a contemporary of Socrates and a follower of Protagoras. He is also mentioned as a Pythagorean, but that probably means no more than that he had learned some Pythagorean science. Plato's dialogue, the *Theaetetus*, which is our only source of information, suggests that Theodorus was learned in geometry, astronomy, arithmetic, and music, the same quadrivium as was mentioned by Archytas. We learn also that Theodorus proved the incommensurability of $\sqrt{3}$, $\sqrt{5}$... $\sqrt{17}$ with 1, which was important in that it rendered the Pythagorean theory of proportion (which applied to commensurables only) inadequate.

Plato was evidently conversant with the sciences of his

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day, and his knowledge of their subject-matter was at least up to date; but he was probably not an original investigator. He seems to come nearest being that in the field of psychology, but even here his interest appears to have been at bottom metaphysical. His great contribution to science was a theory of it.

Plato was faced with a number of separate disciplines or departments of knowledge, loosely called arts and sciences, such as medicine, music, carpentering, arithmetic, geometry, and astronomy. His problem in the first instance was: "What makes any one of these a science and thus distinguishes it from such activities as gymnastic exercise or such literary creations as poetry? The first and most obvious answer is that a science is interested in knowledge, while gymnastic and poetry are directed toward the production of some practical result. This distinction will immediately rule out of consideration all constructions of fancy and all mere bodily activities. But here the problem enters a second stage, because certain disciplines, like music and medicine, seem to combine an interest in knowledge with the production of practical results, and even arithmetic and geometry have practical aspects in calculation and surveying. Now this means that there are really two modes of knowledge; pure knowledge, whose end is fulfilled within itself, and impure or practical knowledge, whose end lies in some effect beyond itself. In the latter, the knowledge is important only in producing the effect, and it is therefore permissible to neglect insignificant fractions in surveying and architecture, to tune the strings of the lyre by ear, and in general to admit slight inaccuracies which do not seriously affect the results. But such procedure is patently improper in pure knowledge, and therefore the second criterion of science is exactness. By this

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criterion we can distinguish between science and the scientific aspect of art, between the science of arithmetic and the art of calculation in any business, between the science of harmonics and the art of music. But here the problem enters a third phase, for even among the sciences there seem to be different degrees of exactness; for example, arithmetic or the pure science of numbers is more exact than medicine. The reason for this, Plato thinks, lies in the fact that medicine and similar sciences are too intimately concerned with concrete objects of sense, which are constantly changing, while arithmetic and geometry deal with ideas of the understanding, whose form is set eternally by their definition. Hence a science is exact to the degree in which it abstracts from sensible objects, and abstractness is the third criterion of science. By this criterion we can distinguish the mathematical sciences from the others, and Plato even suggests the development of a mathematical or abstract astronomy and harmonics. Thus his procedure brings him to the conclusion that the sciences *par excellence* are arithmetic, plane and solid geometry, astronomy, and harmonics.

These sciences then represent systematic attempts to gain pure, accurate, abstract knowledge. But the question now arises: Can the sciences reach this goal which they have proposed for themselves? Plato answers that they cannot, and the fundamental reason why they cannot is that they are separate and partial translations of a reality that must be unitary. Since each of them considers only a part or aspect of reality, it must start with a proposition which may be true for it and yet may not apply in the same sense to other parts. Such a proposition will be an hypothesis, assumed as the most likely beginning; and the procedure of a science, no matter how inductive it seems,

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will really be the deduction of consequences from an uncriticized hypothesis. Now this procedure must finally be established either by the inner consistency of its deductions or by an appeal to facts; in the former case you have still a merely "hypothetical" chain of reasoning; in the latter, you are still bound down to matters of sense. Hence the sciences cannot fulfil the purpose which has created them; and that purpose can be achieved only "when all these studies reach the point of inter-communion and connection with one another, and come to be considered in their mutual affinities," when the various hypotheses can be compared and done away with as hypotheses, when the light of reason "without any assistance of sense" leads the way to one all-embracing, unhypothetical principle. Then and not till then will the sciences become science. Thus did Plato distinguish for the first time between science and the sciences. But he held that the only approach to science lay through the sciences, because science must be the completion of the work of the sciences. Hence science is the highest and best philosophy; and the highest philosophy, or dialectic, as it is called from its method, is science—a view which is the more remarkable when we remember that Plato's master had denied the philosophical utility of science.

We cannot here follow in detail the further course of Greek science. Suffice it to say that scientific investigation continued to flourish. The great contributions made by Aristotle, Euclid, Archimedes, Ptolemy and Galen, for example, were conditioned by the work of a host of less famous inquirers and observers who carried on the living tradition.

It should be evident to anyone who has perused the foregoing résumé that there was an active impulse for

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scientific investigation from the very beginning of what we call Greek philosophy, and that even in the presocratic period a considerable body of natural and mathematical knowledge was amassed. We must now attempt to determine what the relation was between that knowledge and philosophical speculation. Now of the important thinkers who are usually classed as cosmologists only Xenophanes and Heraclitus do not appear as scientists in the strict sense. That means at least that nearly all of these thinkers combined in their activity an attempt to know certain parts of nature with an attempt to explain nature as a whole. But a logical analysis of the systems of these same thinkers has already disclosed the fact that their method consisted in building up a body of theory on a basis of observed phenomena. It now becomes evident that this basis of observed facts was precisely the result of their attempt to know certain parts of nature, or, in other words, scientific knowledge. Hence we are justified in holding that cosmology as a whole was not a mere exercise of imagination under the impulsion of vain curiosity, but rather a systematic attempt to build up a knowledge of the world on the solid foundation of scientific investigation.

There is current, however, a belief that the explanation of nature as a whole influenced the explanation of the parts of nature, or to put the notion in its usual form, that Greek philosophy interfered with Greek science. For example, Mr. Charles Singer, writing on "Greek Biology and Its Relation to the Rise of Modern Biology" (*Studies in the History and Method of Science*, II, p. 4), has said: "Whether we look to such early traces of the scientific spirit as that of the sixth century B.C., when Pythagoras was contriving his first formulated conceptions of the relations of number to form, or whether we consider the

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last vitally original works of Greek science in the second century of the Christian era, when Galen and Ptolemy were giving forth those ideas on the structure of man and of the world that were to dominate western thought for a millennium and a half, from end to end Greek science constantly betrays its descent from Greek philosophy."

Now it seems to me that this is put the wrong way, for the reason that for the most part in the presocratic period philosophy and science were the same thing. This was before the time when Plato separated science from the sciences, and all investigation of nature was still one. If, therefore, Mr. Singer means that a general prior interpretation of the world colored the results of scientific investigation, I would reply that where the two are found together, the balance of the evidence is against his contention, and that there are a good many cases of scientific investigation without any general interpretation. There is no evidence, for example, that Pythagoras' general views biased his statement of the harmonic ratios, or that Anaximander's study of animals was interfered with by his "philosophy," or that the quadratrix of Hippias was the product of his sophistry. And again there were scientists, like Oenopides, Meton, Hippocrates of Chios, and Theodorus, who do not appear to have had any "philosophy" at all.

On the other hand, if Mr. Singer means that it was difficult for Greek investigators to divorce investigation of phenomena from interpretation of phenomena, I should agree with him but at the same time point out that our modern scientists are confronted with the same difficulty. The notion that science consists in collecting purely objective facts is a half-truth that has done much harm in the modern world. To be sure, the first duty of a scientist is

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to observe; but an observation is always a sensation that has been cognized, that is, absorbed and related by a consciousness. A sensation becomes a fact only after it has been thus interpreted and expressed in terms of thought. Hence even a scientist can only interpret what his senses convey to him, and in this particular respect modern investigators must obey the same psychological law which governed the labors of their ancient Greek predecessors.

Moreover, a "fact" of science is not merely the observation of an individual investigator; it must be capable of verification by other investigators, for in one aspect science is the agreement of scientists. Hence the sensation of one must be interpreted in terms which can be used and understood by all, and terms into which it is translated thus become of the utmost importance. Now without doubt the first impulse to science, as we have already seen, was an intellectual one, and it tended to avoid emotion as well as fancy; but the earliest investigators of Greece depended to a large extent on bare feelings interpreted in the ordinary way. Anaximander based his whole theory on the sensations of hot and cold, and apparently thought of these as due to hot and cold principles, which were as separate and distinct from each other as the sensations of them. Anaximenes went further from the sensation and intellectualized the theory by softening the basic opposition between the two principles. Pythagoras carried on the process of intellectualizing by the idea of a correlation or harmony between opposites. Heraclitus went still further in the same direction when he asserted that the opposites of sensation were actually, that is for the intellect, the same. And finally Parmenides ruled sensations out of court entirely. Thus the progress of early

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Greek science up to this point had been steadily away from bare sensation toward intellectual interpretation. The subsequent speculation of the first period represented various theoretical attempts to mediate between the evidence of the senses and the intellect; but the scientific impulse, without waiting for philosophy to solve this problem, continued to investigate phenomena as best it could. In vain did the Sophists insist on the variability and the fallibility of the senses; too many astronomers saw the same movements of the heavenly bodies, too many physicians felt the same indications of fever, to convince them that anything was wrong except their furthest conclusions. It was then that Socrates from the philosophical side showed the fundamental identity in conceptions, and later Plato and Aristotle did a greater service by relating sensation to conception. It may be said that the science of Plato's day, as found for example in the best Coan medical treatises, was asserting the fundamental correctness of ordinary sensation and distrusting the intellectual theories read into its data, while contemporary philosophy, as found in the works of Plato himself, was distrusting the evidence of the senses and asserting the fundamental truthfulness of the pure intellect. In Aristotle sensation and pure thought, science and philosophy are distinguished and related and harmonized.

In the course of this contest between sensation and thought, Greek science steadily progressed, not even halted by the onslaughts of Parmenides and Gorgias; but it seemed to learn two lessons which proved of inestimable value to it. The first was that the sensory element must be reduced below the limit of possible disagreement to an obvious minimum; and the second, which is complementary to the first, was that interpretations of sensuous data

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must be made but made in terms of the intellect rather than of the bare feelings. Thus when Empedocles describes rain as "everywhere dark and cold," he is formulating a certain sense experience of his own, which cannot be verified by other investigators, and he is interpreting this experience in terms of his own feelings. Most modern science rests ultimately on sensations of sight, because these seem to be least subject to error and variation, and Empedocles' description of rain would not now be considered scientific. It may be said that Greek science ordinarily admitted a larger sensory element than would now be deemed proper, and it therefore seems more subjective than modern science; but it should also be said that by Plato's time at least, Greek scientists had learned the fallibility of the senses and the necessity of making intellectual interpretations of their data.

But this method by itself tended to fall into a difficulty almost as great as the free use of the senses, for the attempt to generalize on a minimum of sense data frequently meant generalization on insufficient evidence, and thus led to excess of theory. Some device had to be found to take the place of the senses and determine accurately the characteristics of phenomena. This could be done only by the invention of objective standards, and in this field probably Greek science manifests its greatest weakness as compared with the modern product. The Greeks appear to have had merely rough standards of length, weight, and bulk; we have not only refined these to an almost inconceivable degree, but have also invented a large number of others, such as thermometers, pressure gauges, compasses, clocks, and the like. If Anaximander had had a thermometer, he would have perceived that heat and cold are not separate things. Again, we would not accept the asser-

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tion of Anaximenes that water is condensed air, because we understand condensation as a general process definable in particular substances only by some objective standard of mechanical pressure, and when such pressure is applied to air, it does not yield water but compressed air, or with a lowering of temperature, liquid air; the fact to which Anaximenes was probably referring would now be called precipitation. Thus the invention of these objective standards has not only greatly reduced our dependence on our senses, but it has also made possible accurate investigation of many phenomena which could not have been investigated at all by the unaided senses; and it has enabled us to correct our intellectual interpretations of sensory data. We have, for example, replaced the notions of hot and cold with the more general conception of temperature; on the other hand, we have distinguished meteorological from astronomical phenomena, which the Greeks grouped together as "aloft." In countless ways our scientists are continually extending and checking up their conceptions through the employment of objective standards in experiment. It is perhaps worthwhile, however, to notice that by using these standards of measurement, scientists do but compare new phenomena with old ones whose interpretation has been agreed upon beforehand. A pressure gauge is an instrument which substitutes visual for tactile sensations; and we have agreed to regard a certain obvious position of the pointer as indicating the pressure which we have agreed to interpret as a pound. It is thus impossible for us to escape sensation and the interpretation of it; but the use of these objective standards has reduced our dependence on our senses and harmonized our interpretations of sense data.

The patient investigation of phenomena according to

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the inductive method, which was begun by the Greeks, first brought agreement upon many ordinary phenomena; then new phenomena could be investigated by comparison with those upon which agreement had been reached, until the principle of uniformity and regularity was carried into a vast number of separate fields. And now when many of these fields have been shown to coalesce, there is, as it were, a great network of agreed interrelations between phenomena, into which a newly observed phenomenon must be fitted. Psychologically this means that there now exist many established categories of intellectual interpretation, which can be used by individual investigators and which seem to be objective to each of them simply because he has been taught to regard them as established. The existence of these agreed categories limits the interpretation of new phenomena, and hence a modern scientist has less chance than an ancient to apply peculiar general notions of his own in interpreting his sensory data. In this sense also, our science appears to be more objective than that of the Greeks.

CHAPTER III

THE PRACTICAL AND ETHICAL IMPLICATIONS OF EARLY GREEK PHILOSOPHY

IF IT is true, as I have held, that science, inseparable from the sciences, was included in philosophy in the first period, it does not follow that philosophy was nothing but science. Indeed it appears that philosophy was more than science from a very early point in its development. We may therefore turn our attention to some manifestations of the philosophic spirit, which do not fall within the purview of science.

The first of these manifestations occurs in Pythagoras though it is possible that if our extant evidence for the Milesians was more complete, we would find the same spirit among them also. There are two general facts concerning the Pythagoreans, that seem to be attested beyond question: the first is that they formed and maintained an association for scientific investigation; the second is that the same association stood for a certain way of living and a certain attitude toward life. The scientific activity was the manifestation of a desire to know, while the attitude toward life was the expression of a scheme of values. The second point apart from the first is not significant for our particular purposes, as it simply means that the Pythagorean Order was an agency for moral and religious propaganda. For the history of philosophy we are interested in

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this practical aspect of Pythagorean doctrine, only if it was connected in some way with the theoretical.

Now the fact that certain members, who called themselves Pythagorists, continued to emphasize the primitive taboos and to neglect scientific investigation would indicate that, in their case at least, the scheme of values did not give prominence to a desire to know. Furthermore, those members who did practise scientific inquiry were led to discoveries, that is, positive knowledge, which might seem to have little or no practical value; for example, it is difficult to see how life could be evaluated in terms of a law of harmonic intervals or a theory of numbers. And this seems to suggest that it was not the positive results, but the activity of learning that was valued.

But such an interpretation appears inadequate to account for the sustained vitality of the Pythagorean inquiry, which must have had some unusually strong motivation; and it overlooks the mystical and religious significance with which the Pythagoreans clothed their scientific and mathematical concepts. The only explanation of all these facts would seem to be that a section of the Order at least held that scientific inquiry was valuable, and if we may trust the Parable of the Three Lives, the most valuable kind of life, because it brought the human agent directly into contact with the divine principles which governed the world. In the eyes of these Pythagoreans, therefore, scientific laws and even mathematical formulae did have a value, as the manifestation of a divine operation, appreciation of which meant purification and happiness; and the value of the activity of inquiry was indistinguishable from the value of its results.

With Xenophanes we meet quite a different attitude. He was primarily concerned with the morals of his

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countrymen, and he believed that the current attitude toward life was wrong. His criticisms are directed against delight in mere bodily strength, such as is honored at the great games, and the preference given to athletic prowess over artistic skill (*σοφίη*); against the dainty and effete styles affected in imitation of the Lydians (we may presume that he praised natural simplicity and moderation); against drunkenness and the habit of drinking wine without the customary admixture of water; against the songs about civil strife (Alceus) and disgraceful actions of the gods (Homer and Hesiod). Now in the extant fragments Xenophanes does not explicitly say that these degrading practices are due to a false idea of the gods, but his expressions certainly suggest that he believed this to be the case. Men first picture gods in their own image; then they attribute to them all their own foibles and desires, together with supernatural power or absence of social restraint; and finally they worship them and use them as patterns of conduct. Such are at least the implications of Xenophanes; and we must accordingly suppose that when he introduces a new idea of divinity, he intends that this shall lead to a different morality. Now the idea of divinity which he proposes is just the idea which existed in Ionian science: god is the material world as a whole. Xenophanes therefore uses science or positive knowledge to evaluate life. And he seems to know what he is doing, for in one of his fragments he says that "the gods have not discovered to mortals all things from the beginning, but by searching they find in time what is better." Here "better" obviously means "better to believe," and probably also "better to do." In other words Xenophanes sees that the desire to know has issued in knowledge, by the light of which it is possible to form a truer scheme of practical

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values. But personally he was more interested in those practical values than in knowledge, about which he was sceptical. His attitude might be described by a paraphrase as follows: It is impossible to gain certain knowledge about the gods; but we can construct adequate surmises on the basis of what we do know of the world; and at least we now know enough of the world to be sure that the gods are not such as the poets have pictured them; therefore we ought not to act as if such gods existed.

"Understanding," said Heraclitus, "is the greatest virtue, and wisdom is to speak true things and act according to the principle of the world (or nature), by paying heed to this." Here and in other fragments the Ephesian philosopher unequivocally connects the desire to know with ethical values. His position is that human nature is still nature, and if a principle operates in the latter, the same principle will be found and is found in the former, for the world is "the same for all." And now comes the presupposition that underlies all his thinking: what is right is what is natural, and what is natural is what is logically consistent with our knowledge of the workings of nature. For example, Homer was wrong in praying for the abolition of strife, because strife is the natural state of the world. Some men are free and others are slaves, because strife has made them so, and strife is justice. Drunkenness is bad because it produces an unnatural condition of the soul. Hence for Heraclitus values are determined by the natural order of things, and it is only by discovering that order, which so frequently does not appear on the surface, that we can evaluate. Patently a difficulty lurks in this doctrine, for if the world is the same for all and is regulated by a natural principle, how does it come that a part of it, human nature, can violate the order? And if answer

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is made that it is natural for them to violate the order, for justice is the same as injustice and good and bad are really one, then we must ask why the philosopher presumes to praise and blame, or how any system of values is possible. Such a question, however, was beyond the imagination of Heraclitus. For him understanding is the best activity of men, because only by its means can men assign proper values; and those values are to be fixed in terms of the positive knowledge to which understanding leads.

If our previous interpretation of Empedocles was correct, we must hold that the cosmological Love was a divinity, and that the ethical and religious exhortations contained in the *Purifications* were based on the supposition that correct actions can be only those which accord with the forces which regulate the world. For example, the killing of animals for sacrifice or for food is wrong because it puts into operation the law of Strife, and life depends on the operation of Love. It is therefore necessary to understand the working of these cosmological forces in order to act in agreement with them; and hence "the man who has gained the riches of divine wisdom is happy, while he is wretched whose opinion of the gods is dim." Thus from the purely ethical point of view, knowledge is the road to happiness; and the same holds for the whole practical life of man. At the end of the poem on Nature, Empedocles predicts that knowledge of his principles will bring practical benefits of every kind. In general, therefore, values can be determined only in terms of positive knowledge.

The fact that Anaxagoras placed Mind in supreme control of the world would of itself be a sufficient indication that he valued the mind in human beings above all else, if he thought of values at all. That he did think so is estab-

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lished with considerable probability by the references in later writers, of whom Plato and Aristotle are the chief witnesses. But if we use all the testimony at our disposal, the utmost that can be legitimately deduced from it is that Anaxagoras ranked the theoretic life of scientific investigation as paramount and that his understanding of the nature of the mind might be utilized for practical purposes, as for example in argumentation. Further than that we cannot go.

Although the Sophists were not united in their teaching, did not profess similar doctrines, and did not even start from the same point of view, yet their profession was the same, namely, to impart goodness. Such a phrase is wellnigh meaningless to us, or, if it has a meaning, this is a wrong one. We shall understand them better if we think of them as exponents of individual efficiency, in all phases of political life and in the management of households. They preached a gospel of success and they emphasized accomplishment. Such a doctrine of itself suggests a definite evaluation of life, according to which the only thing that counts is the aggrandizement of the individual under the conditions of a politico-social existence. But this position was not ostensibly antisocial, for it took for granted the common life of a city-state as the necessary basis and requisite which made individual success possible. The Sophists therefore staunchly upheld law, tradition, and convention. Now since success is the desideratum, the only knowledge that can be valuable at all is a knowledge of the factors which spell success; knowledge of nature (if that is possible) is worthless. But furthermore even the knowledge that is useful is entirely secondary to successful accomplishment; it is not valuable *per se*. The Sophists illustrated this idea in their own

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practice, for they were willing to teach anything, provided they would prosper on it. Hence it may be said that the Sophists evaluated life in terms of activities and achievements rather than knowledge; and that with them the desire to know was directed not toward the natural, but the social, conditions of existence, and was subordinated to the desire to succeed. For this reason also they were not interested in a pure theory of values, which is ultimately an aspect of the desire for knowledge.

We have previously found reason to believe that Philolaus maintained the pure religious doctrine of the Pythagorean Order, holding that men's souls are imprisoned in their bodies for a punishment and that release is gained by a knowledge of the divine Harmony in the world. This means that Philolaus, like his Master, put the highest value upon knowledge. But there is no evidence that he followed his Master in setting any value at all on taboos and primitive religious practices of that kind; and the quality of his thinking makes it highly improbable that he held any such beliefs. On the other hand he did advance certain ethical and practical views, which are hardly attributable to Pythagoras in this form. Chief among such is the doctrine that there is a numerical faculty or capacity in the soul which harmonizes perceptions, makes distinctions, and can be made effective in all human activities both practical and theoretical. It is naturally akin to truth, and hostile to falsehood and malice. Philolaus thus seems to suggest that if by study and philosophy we make the divine principle of numerical harmony operative in our souls, we shall not only reap a reward in the next world, but also gain certain practical benefits in this life. Hence not only was the search for knowledge inherently valuable, but the positive knowledge gained in the search

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also brought definite values; and in both cases knowledge was considered as knowledge of nature interpreted mathematically.

The final ethical import of cosmology, Pythagoreanism excepted, was naturalistic in that it had emphasized conformity to the physical laws of the world. But in the rise of Humanism, men had begun to see that there was a whole set of social and political circumstances affecting their lives apparently much more nearly than the cosmological factors. The Sophists had been quick to urge the significance of these social conditions, and had shown the possibility of ordering life in such a way as to take advantage of social environment. Passive conformity to natural law gave way to active manipulation of political laws, and men gained a sense of freedom in living, which was quite impossible when subjection to Nature filled their minds. It was this point of view that Socrates carried into philosophy by developing the idea that man's mind was a free agent and that knowledge made a difference in life; and his search for Justice, the characteristic differentia of human beings, was based on the supposition that the goodness of man was not the same as the goodness of a pruning hook or any other useful instrument, simply because man had knowledge. When Socrates talks of goodness, he is standing on the same ground as the Sophists; when he talks of knowledge, he goes with the cosmologists; but the juncture of the two ideas is his own. The goodness was a quality of man by himself and not as a part of nature, and it was definable in strictly human terms rather than in the laws of water, fire, or air; such an idea did not occur to any of the cosmologists, with a partial exception of Anaxagoras. Moreover, the knowledge was a knowledge of the real world, both inside and

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outside human nature; and such a knowledge had been repudiated by the Sophists. But in the judgment that goodness is knowledge, both terms took on a new meaning, which was typically Socratic. The goodness that could be equated with knowledge was not a mere imitative dexterity in certain external relations of the person, but rather an intellectual quality of the soul; and the knowledge that could be translated into goodness was not a mere objective acquaintance with scientific laws of bodies, but rather an essential intussusception of reality within the soul. And thus from both points of view, the soul was the middle term by which knowledge and goodness were brought together; but the soul in this sense was not grasped before Socrates. The final meaning of the doctrine, however, is closely allied with the thought of Philolaus that the best life is that in which the divine principle of Harmony is enthroned in the soul. For both authors, the soul can develop intrinsically the ultimate reality, but Socrates had a more profound and comprehensive understanding of the soul and of reality.

Democritus and Plato seem to have approached the ethical problem from opposite directions. Democritus saw that even in a world where all was matter and the void, as Leucippus had affirmed, the life of man constituted a special province which demanded separate attention; and he therefore attempted to show how the principles which he posited for the world at large could explain the actions of men. On the other hand, Plato saw that, even granting the preeminent significance of the soul, which Socrates had asserted, yet the soul had relations with another kind of thing which constituted the largest part of the world; and he accordingly attempted to show how the principles which he discovered in the soul could be used to explain

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the world as a whole, or how the world must be conceived in order to account for the presence of soul in it. Thus for Democritus the cosmological problem was primary, the ethical manifestly secondary; while for Plato this order was reversed. But each of these thinkers, from a different point of view, handled ethics in a systematic way, and for our present purpose that is the significant fact. Socrates had been the first to appreciate the distinctive import of human life, but he had been too engrossed with his mission as a teacher to do much more than preach the dignity of life and suggest answers to the questions it raised. Democritus and Plato at about the same time were the first to develop a systematic treatment of the ethical problem, the former from a materialistic, the latter from an idealistic, standpoint.

Now if we pause for a moment and look back over this résumé, we shall find that, aside from the Milesians for whom evidence is lacking, all the major figures in early Greek philosophy, with the exception of the Eleatics and Leucippus, were interested to some extent in attempting to explain the principles of human life. There were scientists, like Oenopides and Meton and Hippocrates of Chios, who devoted themselves entirely to the investigation of special fields of nature; and there were minor thinkers, like Diogenes of Apollonia and Archelaus, whose interest in philosophy was mainly formal and scholastic. Of all such we should expect little or no attention to human affairs. But it is surely significant that all the main figures in philosophy, except the Eleatics and Leucippus, manifested more or less curiosity in regard to the principles that govern human existence. To this list should also be added many writers, like Epicharmus, Pindar, and Euripides, whose literary form ordinarily excludes them

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from the consideration of modern historians of philosophy, but who nevertheless touched on the problems of life with a keen insight that was not lost on Plato and Aristotle. From these facts there can be but one conclusion, namely, that there was a continuous, living tradition of interest in these ethical questions at least from the time of Pythagoras. This interest was never the main one in presocratic philosophy, which was always preoccupied with the world as a whole; but it was present and active both in the main current of cosmology and in other thoughtful circles. Its relative importance within the cosmological speculation ranged from the very high position accorded it by Pythagoreanism to its absence in Eleaticism.

Since this interest was present in presocratic inquiry, its presence in the second period cannot be used as a distinctive mark of this period; nor can we say that the Sophists and Socrates, who inaugurated the second period, originated the philosophic investigation of conduct. What these thinkers were the first to do was to take up the consideration of conduct in its social, not its cosmological, context. Consequently the study of human life, both in its individual and its political aspects, asserted for itself a position independent of cosmology, and began to form a separate discipline within the general field of philosophy. The full development of this tendency and the clear distinction of ethics from politics did not occur until Aristotle systematized philosophic and scientific investigation. Thus it may be said that the second period of Greek philosophy took up the rude ethical questionings and doctrines of the first period, gave them separate, systematic consideration, and so created the discipline called ethics.

Recognition of the ethical doctrines embedded in the

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thought of the first period suggests a somewhat different interpretation of the characters of these early thinkers than ordinarily results from reading the histories of philosophy. All such titles as cosmologist or physiologue or materialist with their accompanying stereotyped tags of monism or pluralism tend to raise connotations of a cold, formalistic, far-away unreality; and when this frigid limbo is furnished with such notions as that water or fire is the material cause of everything, or that we think with our blood, or that air turns into stones, the whole combination takes on a ridiculous light. It is well to correct such impressions with the idea that these early inquirers into the nature of the world were intensely concerned with human existence in all its compelling, tantalizing insistence. Furthermore, most of them not only speculated on the meaning of life, but also occupied themselves with its hard, practical problems.

Thus Thales is said to have favored an Ionian federal state with the capital at Teos, to have introduced the Phoenician practice of steering ships by *Ursa minor*, and to have made improvements in the calendar. Anaximander's name is connected with the gnomon and the first map of the earth; and he conducted a colony of fellow-citizens, probably to the shores of the Pontus. Anaximenes does not appear to have been interested in practical problems, any more than he was in original investigation of nature; and the absence of these two interests, which were found in his predecessors, marks him as a scholastic thinker. Pythagoras is said to have left Samos to escape the tyranny of Polycrates, and that may well mean that he attempted to meddle with government; the Order that he founded in Croton was not primarily political, but the discipline it imposed on its members brought it into con-

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flict with the state and the authority he exercised was in fact partly political. Xenophanes and Heraclitus, like Anaximenes, do not appear to have been either practical or scientific in the strict sense. Parmenides engaged in politics and is said to have made laws for his native city of Elea. Empedocles also took part in politics and appears as the leader of the democratic party in Acragas in the troublous events that occurred after the death of Theron; whether he actually practised medicine or was interested in it from a theoretical standpoint, we do not know. Of Anaxagoras and Leucippus there is no record of practical activities, and we need not continue this catalog further than to add that Zeno took part in politics, Melissus was a Samian general who defeated the Athenians, Protagoras legislated for Thurii, and Gorgias was sent as ambassador from Leontini to Athens. The activities of these early thinkers, which have just been enumerated, are enough to show that many of the cosmologists were practical men of affairs; and when this fact is joined with their interest in the principles of human activity, we ought to be able to gain a truer appreciation of the total inquiry of the period. In reality, cosmology is a name applied to this inquiry simply on account of its predominant tendency; but besides this major interest, there were numerous minor ones of a practical or a purely scientific nature. We have already had occasion to notice that philosophy at this time was not departmentalized and we can now see some of the various strands in the thread of its development. It is to be thought of as a general curiosity, frequently spurred on by some practical need, but immediately rising above the mere requirements of that need, and directing itself to any and every feature of the environment according to the peculiar circumstances of the individual thinker.

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If we attempt to mark the progress of ethical reflection among the Greeks, we can do no better than use the characters in the First Book of Plato's *Republic* as a guide or standard. Whether Plato consciously meant to portray types of ethical development or not, the *dramatis personae* of this Book may be conveniently thought of as personifications of successive levels of morality. From this point of view, the aged Cephalus may be considered as the representative of the primitive, precustomary stage, in which a concrete question of right or wrong is decided according to the peculiar circumstances of the case, and which corresponds to the *themistes* or isolated dooms in legal development; this stage therefore antedates the employment of general concepts, and when Socrates injects a thought of this character into the conversation, Cephalus happily remembers an engagement and begs to be excused. Polemarchus may be taken to signify a second stage, which we may call customary, or proverbial, and in which questions of conduct are referred to a standard more or less fixed by recognized precedents and crystallized in proverbs; this stage therefore has advanced to the point of forming rough objective classes of actions. A third stage is indicated by Thrasymachus, who typifies reflective but uncritical thinking, in which superficial plausibility is mistaken for logical treatment; Plato's choice of a Sophist to represent this period tends to make us underrate the level and put it out of historical perspective, but in reality it is here that the attempt is first made to find some comprehensive, subjective explanation of the traditional classes of actions, and ethics begins. The fourth and final stage is portrayed by Glaucon, Adimantus, and Socrates; this is characterized by critical, fully self-conscious, rational thought, and its superiority over the third stage lies

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mainly in the possession of a logical apparatus and an understanding of psychology.

Without attempting to discuss the difficulties of this classification or to define the idea of progress which it presupposes, let us simply apply it to historical Greek morality, as far as we know it. We should hardly expect to find any literary records of the first stage, which must have been largely prehistorical; but in what is termed Homeric society we can see the transition from the first to the second stage, and the second is completely pictured in the customary, proverbial morality described in Hesiod's *Works and Days*. The third stage would commence with Pythagoras and last through the Sophists; but there are many survivals of the preceding period, as for example in the attempt of Xenophanes to set up a new customary morality and in the proverbial character of Heraclitus' reflections. Socrates, Democritus, Plato and Aristotle all belong in the fourth category, but Philolaus had best be taken to represent the transition between the third and the fourth, and Democritus had not completely freed his mind from the proverbial ideas of the preceding period; both Philolaus and Democritus lived outside the main current of philosophical inquiry, which in their day was largely confined to Athens, and in spite of their appreciation of the problems of knowledge and conduct, their logical and psychological attainments were comparatively meager.

CHAPTER IV

MINOR TENDENCIES IN THE DEVELOPMENT OF GREEK PHILOSOPHY

THE grand general tendencies which characterized the first two periods of Greek philosophy have been discussed in the first chapter. In addition we have considered separately the development of the scientific impulse and of the ethico-practical interest. It remains for us now to trace some of the other tendencies and lines of development that are observable in the first period and that issued later in fruitful ideas.

1. *The Principle.* The first of these is the concept of a principle. Under this term I include all those substances and forces which were posited by the various thinkers as ultimate explanations of the world. In some cases there was more than one principle, and in other cases there is difficulty in selecting the ultimate principle or principles from a group, all of which appear ultimate. This fact suggests that the concept of principle was a fluid one, whose connotations could be stretched to suit the needs of the particular inquirer. If the Greek authors themselves had any word to render this idea, it was probably *φύσις*, and in its usage almost fifty different shades of meaning have been discovered. But if we leave such work to the philologists and attempt merely to form a composite picture of the principles, we see that these early inquirers were searching for some inner nature or essential character

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of the world, underlying various superficial manifestations. Naturally at that period they were thinking of materials; and naturally too they assumed that, if there were any inner nature, the varied manifold of appearances must result from a past process of transformation, so that the present inner nature would be also the primordial condition of the world. What led them to assume this inner nature was no doubt the appreciation of regularity in the external data of nature. The logical process from the idea of regularity to the idea of an inner nature involved the presupposition that similar effects are due, not to similar causes, but to the same cause; but this assumption is latent in all experience and was as evident in mythology and cosmogony as in cosmology. We must remind ourselves, however, that the pure idea of cause was not developed in the first period of Greek philosophy; the thinkers of that time simply said that their principles did or became such and such things, and supposed that uniformity in these effects proceeded from continued activity of the principles.

The list of principles I propose to examine will include the following: Water (Thales), the Boundless (Anaximander), Air (Anaximenes), Limit and Unlimited (Pythagoras), Fire (Heraclitus), What-is (Parmenides), Love and Strife (Empedocles), Mind (Anaxagoras), Harmony (Philolaus). Of the first of these we know next to nothing; but water is an obvious substance, and its movements and transformations are not easily mistaken. Thales may have supposed that it embraced other phenomena, such as sap in trees and silting in rivers; but we shall not be far wrong in thinking of it in his system mainly as it appears to the senses.

The Boundless of Anaximander is perhaps a little less

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obvious, but not much so. We may imagine its creation in the mind of its author somewhat as follows. The processes of nature seem to center about the oscillation between the hot and the cold elements, neither of which appears to govern the other. There must therefore be something behind them both, which produced them and now governs their operation. Furthermore, these elements are "opposite," so that when one advances, the other recedes. Hence the advance of the one cannot be made up from the other, and they cannot pass into one another. Whence then comes the increment when one element advances? It must be derived from a boundless reservoir, which keeps supplying extra quantities to the opposites. But as this reservoir contains stores of both opposites, it is neither of them; it is simply limitless substance. Now it is evident that this principle is not an obvious substance like water; Anaximander may have thought of it chiefly in the form of air, which seems to stretch away to infinity, but the fact that he called it the Boundless rather than any particular material indicates that it was the result of a certain amount of rationalization. It was not merely given in sense experience, but represented sense experience modified by thought. Here then is the first step in the process of leaving sensation in order to find a principle.

The Air of Anaximenes probably exhibits the same stage in this process; but the author was more open in his rationalization than his predecessor had been, for he imagines a state of his principle in which it is invisible. This statement and another to the effect that air is always in motion are no doubt inferences from sense experience. On the other hand, the putative process from air to clouds to water to earth to stones is probably pure sense experience. Thus Anaximenes' principle is a slight modification

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of sensory data by thought, perhaps even a little slighter than the Boundless of Anaximander.

With Pythagoras we are met by the ever recurring difficulty of scanty evidence, and must again have recourse to conjecture. But on the basis of the interpretation made in Chapter III of Part I, we would identify Limit with Fire, and Unlimited with Air. In other words, Pythagoras started with the opposites of Anaximander, but while he stayed closer to sensation in imagining them as particular substances, he went further from it in his doctrine of movement. Physically the function of fire was the introduction of air from outside its original mass, but this act was described as a mathematical limitation. Hence by means of this analogy, Pythagoras attributed to a sensible substance a past unobserved act and a present condition, both of which were rationalizations of experience. Moreover the analogical character of all Pythagorean thought tended to give it a more rational texture than any other presocratic system had, with the exception of the Eleatic.

Heraclitus' choice of Fire for his principle suggests at once a further step in this process of rationalization. To be sure, fire is a perfectly obvious, sensible phenomenon, and no doubt Heraclitus started with it as such; but it is more impalpable and mysterious in its coming and going than the material elements hitherto assumed, so that it was easily supposed to be susceptible of powers and transformations which could not be patent to the senses. Heraclitus frankly prepares us for these by remarking that nature loves to hide and can be discovered only by correcting sensation with thought. Moreover, in the system of Heraclitus, fire is not only the substantial thing we see and feel, but also the name of a universal process of com-

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bustion, which draws the other forms of things into itself and gives them out in opposite condition. Heraclitus pictures this process under the figure of commercial exchange of wares, and of an upward-downward path. Thus we are back with the opposites of Anaximander again; but while the Milesian had taken his stand on sense experience, in asserting that these opposites do not pass into one another, Heraclitus appealed to thought when he affirmed that this is precisely what they do. As an eternal and spontaneous cosmic process by which opposites pass into their opposites, fire was a principle considerably removed from sensuous experience and it therefore represents a high degree of rationalization.

In estimating Parmenides from this point of view, care is needed to avoid confusing the picture that he paints with his method of painting. His method was undoubtedly inferential and logical and the conclusions were therefore not based on sense experience; but these conclusions referred to a world that was substantial and corporeal, and lay at the bottom of all sense experience. Parmenides apparently did not know how to get from this experience to the real world of thought, but that did not to his mind invalidate the conclusions of his thinking. The result is that he attributes to the corporeal world qualities which are not sensible. The world that is real is therefore the same world that we perceive, but not as we perceive it; it is a highly rationalized world, which can be known only by pure thought. Thus the ultimate principle of Parmenides is even further removed from sense experience than the Fire of Heraclitus, though it is still supposed to be corporeal.

It would hardly be possible to go further in the direction of rationalizing the objects of sensation than Parmenides went, although some may be inclined to feel that

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Zeno succeeded in doing so. At any rate the development that now took place lay along a slightly different line and consisted in reducing the attribute of corporeality. The previous thinkers had taken corporeal objects and ascribed to them powers or qualities that were further and further removed from the experience of those objects. Later thinkers took forces or capacities whose corporeality was not amenable to sensation, and attributed to them a quasi-corporeal existence. It was manifestly impossible for Empedocles to perceive Love and Strife, or for Anaxagoras to experience Mind, as individual corporeal objects. Yet if they existed, what were they? The authors seemed to feel that they must be corporeal while knowing that they were not corporeal in the sense of objects of sensation. Furthermore it was their form or capacity to cause motion rather than their corporeality that interested Empedocles and Anaxagoras, and they therefore ascribed to these forces only enough corporeality to insure their existence. Thus the corporeality of the principles was minimized, and rationalization was turned in the direction of a distinction between substantiality and corporeality.

Another advance in this direction was made by Philolaus in his discrimination between the form of an object and the corporeal stuff of which it was made. Apparently he thought of a form as active, that is, as a force like Love and Mind; but it was differentiated from mere stuff also by its mathematical qualities, which were of course geometrical rationalizations. Hence it was not merely as an activity but as a thing that it was different from the ordinary objects of sensation.

That was as far as presocratic inquiry progressed on this line, but it was a noteworthy development. Cosmology was essentially a systematic attempt to explain the regular-

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ity of nature, and it began its explanation by recourse to obvious elements like water or air. From the beginning, the preeminent status of these material principles drew to them certain infinite characteristics previously associated with divinity, and to some of them also were attributed the tenuous and penetrative quality of soul. But as the processes of nature were studied more carefully and extensively, the difficulties in explaining them all as the results of natural changes became clearer and were only temporarily met by attributing to the principal element these hypothetical powers and capacities. The next essay was somewhat different and consisted in giving an observed force hypothetical existence as a cosmological element. The main difficulty here, as the case of Anaxagoras plainly shows, came in connecting the observed processes of nature with the principle, or in other words, in expanding an observed force into a state of existence suitable to explain all other observed forces. In both types of explanation—that which theoretically enlarged an element and that which theoretically enlarged a force—the mental process by which the enlargement was effected was rationalization or correcting sense experience by pure thought. And in the course of this development, the principles became more and more a different kind of thing from the ordinary objects of experience. The apogee of this development in presocratic inquiry is found in the forms of Philolaus, which can hardly be described in corporeal terms at all.

It remained, however, for Socrates to take the decisive step, for even the Harmony and the Forms of Philolaus were implicitly, if not explicitly, corporeal. Socrates' idea of Forms would not by itself give conclusive evidence of advance over his Pythagorean predecessor; but when it is

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put into conjunction with his doctrine of soul, there can be no further doubt that he had grasped the concept of incorporeal force. Curiously, neither he nor his great pupil Plato ever satisfactorily explained the ultimate relation of soul and form; but both of them were able to work fruitfully with these ideas. Here then we see the creation of the incorporeal in philosophy, as the culmination of pre-socratic rationalization of natural elements and forces.

2. *The Intellect.* After surveying the results of rationalization in early Greek philosophy, we naturally ask ourselves how far the thinkers of this period appreciated the meaning of what they did in forsaking the evidence of sensation for a higher truth. The problem can be more accurately investigated by analyzing it into two subsidiary questions: to what extent did these thinkers assume a faculty above sensation? and how did they differentiate between it and sensation? Let us now consider the evidence on which our answers to these questions must be formulated.

With regard to the Milesians and Pythagoras, we can say at once that there is no such evidence, and it is inherently improbable that these thinkers considered the matter at all. Xenophanes seems to have been the first to realize that there was a difficulty in attempting to understand the world. To know what is certain, complete, and true (σαφές, τετελεσμένον, ἔτυμα) is, he says, impossible for human beings; what we have to do is to investigate and gain a better opinion (δόκος) that shall be like the truth. Further than this Xenophanes did not go, but this is enough to show that the problem of truth had started to force its way into the consciousness of early Greek inquirers.

This problem reached a more acute stage in Heraclitus.

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In his fragments we meet again and again praises of "wisdom" and "thought" and "understanding," which are contrasted with folly, ignorance and the testimony of the senses. The kernel of the whole matter is seen in the statement that "eyes and ears are bad witnesses to men, if they have untutored (*lit.*, barbarous) souls." Here there is a plain distinction between the senses and the soul as organs of knowledge; and the implication of this and other fragments is equally plain that wisdom or understanding comes from the soul. Certain of the author's statements make it probable that he believed knowledge depended to some extent on sensory evidence, and we cannot tell precisely how he differentiated between the senses and the soul. But on the basis of this evidence that we have, we can say that he definitely attributed a knowing function to the soul and that this function was superior to that of sensation.

Whatever our interpretation of The Way of Opinion may be, the fact that no one can gainsay is that Parmenides opposes it to The Way of Truth, and thus consciously contrasts truth with mere opinion. In this he is following in the footsteps of Xenophanes, but he differs from his predecessor in believing that truth is attainable by mortals. To be sure, ostensibly this truth is a possession of the goddess, vouchsafed to men by a revelation; but the apocalyptic form is only a form, for actually the truth is gained by the processes of logical inference as the author himself is fully aware. Our conclusion must therefore be that Parmenides means to hold up truth as an attainable human ideal, and to contrast it with opinion. In the next place, the end of the Prologue leaves no doubt that he deliberately made this truth a matter of thought by argument, as opposed to the habitual method of inquiry by

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eye and ear; and the development of his own system in *The Way of Truth* shows how he followed this idea. Now he says that there are only two ways of investigation, the way of truth and the way of opinion; hence if he identifies the former with the operation of thought or argument, and contrasts this thought or argument with sense experience, he must mean that the way of opinion rests on sense experience. Finally, Parmenides has nothing to say about the relation between truth and opinion, beyond the assertion that opinion has no truth in it. In *The Way of Opinion*, however, he advances a theory that thought is the substance of the limbs and its character therefore depends on the proportion of the light and dark elements; in this he is no doubt conscious of a physiological distinction between it and the senses, which are localized in particular organs, but he makes no functional differentiation or correlation between them. Thus the founder of Eleaticism developed the idea of truth as the goal of all inquiry, to be gained by processes of reasoning without interference from sensation, which could only lead to false opinion.

Alcmeon made an interesting contribution to this subject by suggesting a distinction between understanding and sure knowledge. The latter, he held, was a prerogative of divinity; but the capacity to understand was within the powers of human beings, and by this capacity they were distinguished from the beasts, which have sense perception only. Alcmeon of course knew that humans have sensation also, and hence his doctrine had the effect of setting up two distinct faculties, understanding and the senses.

In Parmenides and Alcmeon we have already witnessed the beginnings of an interest in the data of physiological psychology; and Empedocles advanced the study a step

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further by his theory on the mechanics of thought. To a certain extent Empedocles seems to distinguish thought from sensation, and he localizes the former in the region around the heart, where the elements in the body are most evenly mixed. But he does not state explicitly any functional difference between thought and sensation or even feel the need of any central synthetic faculty; so that in the end thought appears to be only a more perfect perception. At the same time, in spite of this physiological confusion, Empedocles certainly did appreciate and emphasize thought, understanding, wisdom, as the highest human capacity, and in so doing he undoubtedly contributed much to the philosophical aspect of the problem.

According to Anaxagoras, the soul or the mind is entirely separate from the material elements which compose the body. Now the soul must be the organ of thought; but the senses are bodily organs affected by physical disturbances. There arises therefore a problem as to the relation between the mind and the senses; but Anaxagoras did even less to explain this relation in the psychological field than he had done with the cosmological relation between Nous and the corporeal elements. It appears that all animals and even plants had Mind or intelligence, and that this intelligence was the same wherever it was found. Hence different levels of intelligence cannot be explained as due to various degrees or qualities of Mind but must be attributed to the relative perfection of the bodily structures in which Mind dwells. In other words, there can be no thought at all unless Mind is present, but the grade of thought depends upon the opportunity afforded it by the bodily structure in which it is embedded.

Diogenes of Apollonia brought consistency to the scientific view of intelligence, which was adumbrated by Par-

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menides and Empedocles; for he made his principle, Air, the organ of thought in the body and related it physically to the senses. Thinking is the activity of the pure dry air in the brain, and the special senses are connected more or less directly with this organ. Hence thought represents a purely physical activity, which can be differentiated from the special senses but which is in reality only complete sensation.

Philolaus held that the principle of Harmony, which exists in the soul, unifies sensations and makes objects known by means of their numerical specifications. Truth therefore is akin to number and is attainable by the soul through knowledge; falsity (not ignorance) is its opposite, and has no relation to number. In what falsity consists or how it is possible, Philolaus does not state.

If we glance back over this development, we discover that a problem of truth has emerged in three separate forms. The first is involved in the question as to how far human knowledge can penetrate into the secrets of nature and how far such knowledge is a property of divinity. This question was discussed by Xenophanes, Alcmeon, Empedocles, and Philolaus, and it was specifically concerned with the natural limit of knowledge. The second form of the problem arose from conflicts between the views of various thinkers when the natural feeling of antagonism aroused in one inquirer against the doctrines of certain predecessors or rivals led him to denounce these doctrines as false. This feeling was manifested by Heraclitus, Parmenides, and Anaxagoras; and the question raised by it concerns the quality or the rightness and wrongness of knowledge. There was also a third form of the problem, which was due mainly to physiological theories and turned on the distinction between thought and

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sensation. This point was handled by Heraclitus, Parmenides, Alcmeon, Empedocles, Anaxagoras, Diogenes, and Philolaus, and essentially it related to the origin or process of knowledge.

The question concerning the natural limit of knowledge had virtually become obsolete by the end of the first period, for as both theory and science increased, it seemed to be taken for granted that a positive knowledge of nature was possible. At this point the Sophists opened their attack, and though there is no evidence that they believed knowledge to be a property of the gods, some of them did deny the possibility of truth. It is therefore interesting to observe that when the great philosophers of the succeeding period had repelled the sophistic assault, they posited the ideal of a complete knowledge as a characteristic of divinity, although this notion amounted to hardly more than a religious sentiment.

The third or physiological aspect of truth had led in the presocratic period to a variety of views, which had very little in common. These views were affected to a greater or less degree by the general cosmology of particular authors; and to a certain extent also this question of physiological psychology was bound up with the question as to the philosophical distinction between truth and opinion or ignorance. Yet the systems of this period, crude though they were, yielded two general types of theory on this point, which were significant. There was the view of Empedocles that thought was merely a more perfect sensation and a function of the body; and there was the doctrine of Anaxagoras that mind was unmixed with the body and of an essentially distinct nature. The doctrine of Anaxagoras was of course useless to science and was not pursued further for its own sake; but when it was

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combined with the philosophical distinction between thought and false opinion, it produced the concept of mind as an organ of thought, distinct from the body, and as such it was developed by Socrates. With regard to the physiological problem, progress was made during the second period in isolating it from cosmological and epistemological considerations and investigating it scientifically.

The notion of truth as a body of correct knowledge distinguishable from falsehood, ignorance, or opinion undoubtedly existed in presocratic inquiry; but it elicited only dogmatic assertions from the authors of the period, for it always rested on a basis of personal conceit. It was this element of personal particularity, combined with the wide variations in substance, that made cosmology seem so vulnerable. Scientists still offer different explanations of certain facts, but this phenomenon does not now suggest scepticism, because each modern scientist does not claim a complete and final truthfulness for his own views. But many of the presocratic thinkers did this very thing, and their conflicting claims, as well as their incompatible views, opened the way to a general attack on the whole position. Thus this notion of correct knowledge was never investigated on its merits until the Sophists assailed it; then it was examined apart from personal pride and became one of the leading topics in the philosophy of the second period.

3. *Anthropomorphism*. It might seem that even the slight attention bestowed on knowledge by the presocratic inquirers would have suggested to them that there are two sorts of things in the world, those that know and those that do not; but all the evidence for the period (with a partial exception in favor of Alcmeon) shows that no such distinction was felt. On the contrary, several of these phi-

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losophers looked upon thought as one of the properties of material things. For Xenophanes, god is just the world; "but without toil he sways all things by the thought of his mind"—the world thinks. Heraclitus speaks of "the thought which is able to steer all things through all things," yet this thought must be Fire. For Parmenides wisdom is a quality of the light element; and Empedocles believed that all things have thought, which is a consequence of even mixture of the four elements. Thus there was no real distinction between things that think and things that do not, nor even between animate and inanimate things until the time of Anaxagoras.

Now this is a surprising fact, not only because to us the distinction appears self-evident, but also because it was taken for granted in the rest of Greek literature from the beginning. For Homer there were gods, heroes, and men on the one hand, and the rest of the world on the other. Hesiod expressly says that Zeus gave Justice to men only and that not even the animals had a share in it, so that by the possession of this quality human beings stood out from the rest of the world. Hence the cosmologists were not simply reproducing a traditional notion when they reduced man and matter to the same terms; and we must ask ourselves why they should have done so.

No doubt the fact can be partly explained by the failure of the cosmologists to study humanity and civilization—their interest was in the whole of nature, and they largely overlooked the special characteristics of that part of nature which is man. But this cannot be the whole story because the quotations previously given prove that some of them at least did notice intelligence, thought, and understanding. Our problem thus becomes specific in the

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form: why did the cosmologists attribute thought to nature?

The answer, I believe, is two-fold, and as follows: In the first place, it appears that intelligence or thought connoted directive power perhaps more than what we mean by cognition. Thus Xenophanes can speak of god (the world) swaying all things by thought, Heraclitus of thought steering all things, and Empedocles of god's mind flashing through the world with rapid thoughts. These are phrases that suggest a governing power, rather than a capacity of becoming aware of external objects; and that seems to have been the chief meaning of the word in presocratic inquiry. Even Anaxagoras, who distinguished the animate from the inanimate, attributed Mind to plants, and such a doctrine becomes intelligible if mind meant vital force. On the other hand, the awareness of other objects was merely a matter of receiving impressions from them, and formed part of the general interactivity of natural things. A man's sensation of a thing belonged to the same category of natural processes as the falling of one object on another and the subsequent effect; and it deserved special attention only because the man and the thing perceived frequently appeared to have no physical contact. But this was explained by such devices as invisible effluences or images and was thus kept distinct from intelligence, which was a vital force directing the activity of that within which it resided.

In the second place, the principles assumed by these thinkers were materials that had an inherent power of movement and by that power governed the world. It was therefore this directive power that was meant when the thought or intelligence of the principle is mentioned. Furthermore, the principle operates within the world, and

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any objects in which it exists will have its characteristics of motion and intelligence. In this respect human beings are not different from other parts of the world in which the principle works.

The point of view thus summarized does not include what Parmenides meant by λόγος. That was neither a directive force nor a faculty of sense, but a manipulation of ideas. From the author's awkwardness in describing it, we may be quite sure that he did not understand it; and though subsequent cosmologists appear to have felt the force of his conclusions, none of them outside his own Eleatic circle adopted his method. His method of argumentation remained an anomalous thing in presocratic philosophy.

Now when we pass beyond the limit of cosmology, we find that the Sophists, who were not interested in nature, did not concern themselves with intelligence as a cosmological force but presupposed intelligence as directive power in human beings. Indeed it was this human intelligence and its various external manifestations in action, with which the Sophists chiefly worked and which they exalted by their teaching. But their attitude toward the capacity of becoming aware of objects was entirely different. This faculty, they suggested, depended on a physiological mechanism that was peculiar to each individual and thus produced a different result in each case. Gorgias maintained that these results never agreed; Protagoras, that they agreed enough to permit the striking of an average (custom); but these two concurred in holding that the process could not yield a common, definite knowledge. Thus the scepticism that spread out from this source was founded on sensation and not on intelligence.

In order to answer this attack, two new positions were

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developed. The position of Democritus and the Atomist School was that knowledge was made possible by a faculty of perception that was better than sensation though of the same essential nature, and that this faculty of perception was joined with directive intelligence. The whole human mechanism was thus unified on a materialistic basis, with perception as one of the faculties of intelligence. On the other hand the position of Socrates and Plato was that knowledge was made possible by a cognitive faculty entirely distinct from sense and partaking of the nature of intelligence. Thus the human mechanism was split in two, with cognitive intelligence on the one side and the sensory capacities on the other. Both these theories therefore agreed in compounding the capacity of representation with the capacity of self-direction, so that neither of them ever succeeded in developing a definite notion of will as a capacity of making certain ideas effective. But while the Atomist theory accomplished this union by reducing intelligence to the level of perception, the Idealist raised perception to the level of intelligence. For the former, intelligence, perception, and sensation were different modes of the behavior of body; for the latter, sensation remained a bodily process, but perception and intelligence were united on a higher level as capacities of soul. For this cause also, Democritus did not appreciate the nature of reason, while Socrates and Plato took over the Parmenidean notion and made it the chief characteristic of mind, which then included directive intelligence, perception or representation, and logical manipulation.

The lack of any proper distinction between human beings and the rest of the world (including what we now call inanimate objects) makes it difficult to determine how far the presocratic thinkers attributed human char-

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acteristics to things not human, because we cannot determine what, if any, characteristics were considered specifically human. For example, if intelligence or thought meant directive power, that may have been supposedly observed just as much in nature as in men. Or again, the force of Love to which Empedocles refers may have been just as much the union of dark cold rain with bright warm sunlight in the plant as the attraction of male and female. But the fact that all these terms, such as thought, justice, and love, were traditionally used throughout the rest of Greek literature as specifically human qualities makes it extremely likely that the cosmologists found them as such and extended them to the natural realm when they unified the world.

Now etymologically the term anthropomorphism applies to a representation of a non-human thing, usually a deity, under a human form; but the term has also a wider significance, according to which it denotes the ascription of any human characteristic to things not human. And this latter use is applicable to the practice of Greek cosmology, which we have just been noticing.

✗ If therefore we adopt this terminology, we can say that there were in Greek history two stages of anthropomorphism; the first or physiological anthropomorphism consisted in representing divinities with human figures and in fact all human characteristics, but freed from the limitations of human existence; the second or psychological anthropomorphism consisted in representing divinities, not with human figures, but with the intelligent capacity of human beings, freed from the limitations of human existence. ✓ Both of these stages of anthropomorphism were no doubt developments of a primitive animism, so that the second

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stage was not merely a reconstruction of the first stage but also a recrudescence of something still more ancient.

The second stage was a phase of cosmology, and the position is fully stated by Xenophanes, and repeated later by Empedocles. The words of the latter are these: god "is not furnished with a human head on his body, nor do two branches sprout from his back, nor has he feet, swift knees, or hairy parts; but he is only a sacred and ineffable mind, flashing through the whole world with swift thoughts." On account of the biological cast of Empedocles' system, there seems little doubt that he is here extending a specifically human faculty to his deity. The same is true of Anaxagoras, but in a different sense, because almost all qualities were eliminated from his cosmological principle, except intelligence—it is almost literally a deification of intelligence, and one of the purest examples of psychological anthropomorphism on the materialistic basis.

The humanistic movement tended to dissociate man and nature; but in doing so, it had the effect of taking force out of nature and giving it to man, as a manifestation of intelligence. It then became necessary to find a force outside of nature, that was capable of moving nature, and this force was called god. But since again it seemed inevitably to take on the aspect of directive power, this force that ruled nature was believed to be intelligent like the similar force in human beings. Thus psychological anthropomorphism persisted, but in the second period it referred to a supernatural spirit while in the first it had referred to a natural substance. This psychological anthropomorphism with respect to divinity lasted and is with us still in religion, but Christianity has attempted to

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bring it to a higher level by emphasizing the element of pure emotion or sentiment together with the element of directive power or intelligence.

Moreover, although the separation of man and nature theoretically allowed the latter to be studied in itself, yet there was a practical difficulty for the simple reason that it was still man who was making the study. The human investigator had not only to interpret what he saw in nature in terms of nature, but he had also to express his interpretation in a language that had been developed without regard to any thoroughgoing distinction between man and nature. Thus when he saw natural objects move, his tendency was to think of the process in terms of his own movements, i.e., as actions; or when he observed one natural process always followed by another natural process, he interpreted their relation like that between his motives and his actions, i.e., as cause and effect. And language seemed to aid the confusion, for the Greek, like ourselves, used the active voice for natural objects as well as persons. It was and is as natural to say "the sun shines" as "the man moves," although the subject in one case is an inanimate object and in the other a human being. Possibly the accident that the Greek language had a middle voice for reflexive actions and that most of the tenses of this voice were not differentiated from the passive was a special contributory circumstance, by unconsciously classing together actions in which the agent acted on himself with those in which he was acted upon by some external agent. Be that as it may, even during the second period of philosophy, the Greeks with the language at their disposal did not succeed in ridding nature of human traits, or rather in developing the idea of a nature that was entirely

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free of human characteristics. Their "causes of motion" were reasons and seemed to act intelligently, so that in this form again the old psychological anthropomorphism persisted. How little we should blame them for it can be appreciated by reviewing the almost desperate struggle that has gone on since their time in attempting to rid science of these very anthropomorphisms. Galileo started, and Newton completed, the substitution of the idea of force for cause of motion, and now we are told that "The very idea of Force is . . . what would be termed an anthropomorphism, that is to say, it ascribes the behavior of inanimate objects to causes derived from the behavior of human beings."¹ And after we have substituted "energy" for "forces," shall we not still be guilty of anthropomorphism in speaking of inanimate objects as having a behavior?

Thus the psychological anthropomorphism of the first period continued during the second period in two separate forms, one religious, the other scientific and metaphysical. And anthropomorphism is not merely a stage in religious development but a general philosophical problem.

¹ Frederick Soddy, *Matter and Energy*, p. 20.

CHAPTER V

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IN the previous chapters we have followed some of the more significant doctrines from thinker to thinker, and attempted to understand the particular features which a doctrine received at the hands of a particular author. This method has in reality involved a presupposition, which we must now make explicit. If doctrines passed from hand to hand, if there were tendencies of thought that seemed to develop, if Greek philosophy was anything more than a name applied to a number of separate individuals, then there must have been some kind of a unity in which the development took place and of which the tendencies formed part. I say that the method employed in the foregoing chapters implies that there was such a unity, and we must therefore attempt to justify this view.

That there was a conscious connection between some of the thinkers we have studied is proved by the references they made to one another. Thus Xenophanes seems to refer to Pythagoras; Heraclitus condemned the polymathy of Pythagoras and of Xenophanes by name; Parmenides almost certainly had Heraclitus in mind when he wrote a certain passage, and probably he was thinking chiefly of the Pythagoreans when he described the opinions of mortals; Democritus is said to have named Anaxagoras; Plato mentioned a good many earlier thinkers; and Aristotle, who knew the views of all of them, seems to have regarded

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his own system as the consummation of all the previous philosophy. Again there is unmistakable evidence that from the beginning Greek philosophy was organized in schools, of which the chief, before the foundation of the Academy, were the Milesian, Pythagorean, Eleatic, and Atomist. The weight of evidence from these two sources cannot be ignored; but it does not altogether fulfil our present requirement, for the first contains large gaps and the second indicates several different centers of gravity, as it were, but no fundamental unity.

The truth is that we cannot demonstrate a unity underlying Greek philosophy; we can only make it seem probable by adding to the evidence already adduced an interpretation of the various systems which shall bring out their logical interrelations, if any such are to be found. In the more detailed examination of these systems, which was made in the first Part, I attempted to show in each case separately how particular views of the author were connected with preceding inquiry. I shall now undertake what may be termed a metaphysical paraphrase of these systems as wholes, in the course of which it will be possible to emphasize their relations to one another. A paraphrase of this sort, no matter how successful, could not be claimed as proof of anything save the possibility of conceiving Greek philosophy as an organic whole; or perhaps, if the connections could be shown to be close and neat, the method might establish a favorable presumption. Even so it will be worth the effort. If exception is taken to this procedure on the ground that it really amounts to interpreting the systems in such a way as to establish tendencies and then using the tendencies to support the interpretation of the systems, I must at once admit a certain justice in the objection. It is a circular method; but historical criticism always

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involves this process, which indicates in the end that the facts reinforce one another. And in the present case, we are always bound to a certain extent by the expressed views of the authors, with which our interpretation must be consistent.

In our first discussion of the Milesian thinkers, we endeavored to understand them as engaged primarily with the explanation of regular movements in the physical world. A logical analysis of the idea of regular movements shows that it embraces under regularity an element of stability and permanence of identity, while the movements suggest an element of change. We may therefore think of these Milesian inquirers as attempting to reconcile change with stability in the physical world. This reconciliation they effected by means of the idea of an active, penetrating substance, which maintained its identity while causing change; and when they had discovered such a substance, they had, it would seem, satisfactorily answered the question: what is the world? But as a matter of fact, we find that the question: what is it? seemed to their minds to involve a further question: how has it come to be? because their notion of change was anthropomorphic generation. Hence their answers took the form: it is now the product of such and such a process, or the descendant of such and such ancestors; where the element of change appeared in the generation or process, and the element of stability in the permanence of the original substance. This is the constructive unity which appears under the varying particulars of the three Milesian systems.

To the question: what is it?, Thales replied: it is water; but as to the process of change, we can only speculate with Aristotle that Thales conceived of it by some improper generalization of evaporation, saturation, silt-

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ing, and so forth. Anaximander was struck by the periodicity in nature, exemplified by the seasons and the celestial movements; but he mistook the sensory effects of these changes for their real nature, and so invented the doctrine of opposites, which dominated cosmology for a generation. His answer to the cosmological problem thus took the form: the world is a boundless body which has differentiated itself into parts with opposite characteristics, and the interplay of these opposite parts is the regular process of nature. Anaximenes combined this doctrine of opposites with Thales' idea of a unitary substance; and his answer therefore was that the world was essentially air, which had differentiated itself into parts by a regular process in opposite directions, that was still observable.

Thus when reduced to their lowest terms, the answers of the three Milesians to the problem of nature all appeared in the same form, namely, the world is a changing substance. Pythagoras seems to have emphasized the process rather than the substance, and his answer therefore appeared as a concept of stable change. The difference between the Milesians and Pythagoras was largely a matter of emphasis, for the idea of fixed change was embodied in Anaximander's *Justice* and Pythagoras was unquestionably thinking in terms of substance. But the point worthy of notice is that in his mind the problem centered around the methods of transformation rather than the substantial forms which resulted. His studies in geometry and harmonics had shown him how certain parts of nature were amenable to mathematical specification, and this probably led him to conclude that the relation between the opposites was a principle of harmonious interaction. If this were so, the whole world from its gross elements to its minute processes must move according to a precise law of interrela-

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tion. Hence his answer to the problem raised by the Milesians might be expressed as follows: the world is essentially a mathematical Harmony, which has differentiated the whole into parts and now presides over the movement of the parts.

The same general tendency was carried a step farther by Heraclitus, who emphasized the idea of change to a point where a stable substance became virtually impossible. He argued that if the world is a unity and if it changes (presuppositions of all earlier cosmology), then it must all change, and nothing, not even a material principle, can have a stable identity of its own or be permanently stereotyped against other forms. Hence the appearances of stability and permanence are illusions of the senses, which must be corrected by thought; and the only real stability which thought can discover in the world is the very process of change. Essentially this change is the strife of opposites, which is typified in the process of combustion. It is impossible to determine now whether the foregoing considerations were primarily logical or physical, but at any rate they were supported by appeal to the facts of nature. Here, however, the thought reaches a new and more metaphysical phase, in which we are shown that since no thing is identical with itself, it may be identical with its opposite, and therefore the strife of opposites may be considered harmony or attunement just as well as strife, and in general change is stability and stability is change. But Heraclitus' own emphasis was on the aspect of change, and his answer to the cosmological problem was in the form: the world is, as it has been, a process of transformation, in which no thing is stable.

Parmenides appears to have seen that the metaphysics of the Heraclitean position made nonsense of the whole

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business, for it rested finally on the assertion that a thing is and is not identical with itself. The first task that had to be undertaken was therefore an attempt to understand what we mean when we make an assertion about a thing. Parmenides believed that such an assertion implied that the thing in question had an identity by which it could be distinguished from other things, and that it had a real existence as such an identity, which made thought about it possible. Now if you apply only the first of these criteria and do not bother about the philosophic question of existence, you find that the world is an ordered system of relationships between apparently separate identities, the knowledge of which constitutes science. But if you argue strictly and raise the question of existence, you must immediately infer that empty space is unthinkable and non-existent. Hence two conclusions are inevitable: first, that the world is a continuum; second, that motion, which depends on empty space, is impossible. It follows that the particular things to which we give names have no existence apart from the world to which they belong and that the world as a whole is the only thing which does exist. Furthermore the names which we give to these particular things are inapplicable to the whole, because it contains other things and qualities, so that the only statement you can make about the world is that it is. Thus the content of the existent (substance) and the fact of its existence are merged; and the answer of Parmenides to the cosmological problem became: the world is a stable substance in which change is impossible.

Philosophy had now explored the idea of a self-transforming substance to an issue of two contradictory conclusions, for on the basis of that idea Heraclitus had made stability impossible and Parmenides had made change

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impossible. If there was to be any further progress, it must be on other lines but it must also be able to reconcile these two extreme positions, for stability and change were facts of nature too obvious to be denied. In reality what Heraclitus and Parmenides had done was to disentangle these two ideas from one another, and show that change could be conceived apart from substance and substance apart from change. Hence in the succeeding systems we find the idea of a transforming substance gradually replaced by the two concepts of matter and of force, which in one form or another have dominated science from that day to the modern theory of energy. The first step in this direction was merely the assumption of a cause of change outside the substance, and we may trace the development of this concept in the Love and Strife of Empedocles, the Nous of Anaxagoras, the Harmony of Philolaus, the Form of the Good of Socrates, the god of Plato and of Aristotle; the Atomists too are only partial exceptions; for the first motion of the premundane atoms was entirely distinct from their substance, and the authors of the theory simply did not face the question whence this motion came. The assumption of these causes entailed a discontinuance of the old idea of spontaneous change with its subsidiary notions of coming into being and passing away, and its place was taken by the notion of rearrangement. This in turn necessitated substituting for the old unitary substance a plurality of substances which could be continually rearranged. Moreover the withdrawal of the cause of change from substance tended to leave substance more and more inert and colorless, till it assumed its Aristotelian form. It was always supposed to be qualitatively stable after Parmenides, and the old cosmological problem of reconciling stability with change now became: granted

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the stability of substance, how is the appearance of change explicable? These were the lines on which philosophy now proceeded, and we may remark again that they seem to have been set by the conclusions of Heraclitus and of Parmenides.

Empedocles started with the Eleatic conclusion that substance is unchangeable, and on that basis he attempted to save the appearance of change. To this end he postulated four qualitatively distinct substances (earth, air, fire, water), which remained the same in quality (dry, cold, hot, moist) but mixed in varying proportions to form the manifold objects of nature. He also assumed two forces of combination and separation (love, strife), whose activity produced change. Apparently these two forces in turn were governed in their interaction by a supreme law of necessity, working through a succession of cosmic cycles. Thus the form of Empedocles' answer to the cosmological problem would be: the present state of the world is a stage in a cosmic process which is essentially the steady mixing and separation of four irreducible substances by the force of Love and Strife.

Anaxagoras also frankly accepted the Eleatic conclusion that substance is unchangeable; and he adopted the idea of mixture; but he differed from Empedocles in his conception of the elements. He believed that you might analyze an object *ad infinitum* but you would never reach an unmixed or simple element. On the contrary, the least particle (which he called "seeds") of any object, to whatever point you might divide it, would contain portions of each of the fundamental qualities (hot, cold, moist, dry). It was, Anaxagoras held, quite unnatural to turn these qualities into bodies, as Empedocles had done, for that was like cutting the world into quarters "with a

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hatchet"; on the contrary, if matter is infinitely divisible, the smallest particle of flesh, for example, would still be flesh, that is, would contain all the qualities in the same proportion as in the undivided object. Hence a thing gained its individuality by the particular proportion of the qualities in its composition, and change was the mixture and separation of the qualities in infinitely varying proportions. The proximate cause of this mixture was a rotatory movement of the mass of the world in the course of which portions were detached and differentiated; it was therefore purely mechanical. But Anaxagoras seems to have asked himself what lay behind this mechanical fact. Now from the broadest theoretical outlook, the predominant characteristic of all physical change is the order and harmony that runs through it even in its mechanical aspect—it seems to be arranged to act in the proper way. But the only force capable of ordered arrangement in its actions was the very Intelligence that was being glorified in Athens at the time, and Anaxagoras accordingly called the governing force of his system Mind. The assumption of this cause also enabled him to account for the presence of intelligence in certain parts of the world, to explain the difference between animate and inanimate nature, and to rationalize the superiority of human beings. Thus change was made possible by means of mixture, separation, and revolution, gradually spreading through the universe. Therefore the answer of Anaxagoras to the cosmological problem might be phrased as follows: the present state of the world is the result of mixture and separation of the opposites by means of a rotatory movement, which has been extending through the universe under the original direction of Nous.

Like Empedocles and Anaxagoras, the Atomists ac-

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cepted the Eleatic verdict that substance is unchangeable, and proceeded to explain change by the mixture of a plurality of qualitatively stable elements. The Atomists agreed with Empedocles that the divisibility of matter was physically limited and stopped with particles of a definite size; but they also agreed with Anaxagoras that the number of these elements was infinite. Change was produced by mixture and separation of these atomic particles through mechanical processes; the first definite process was a vortex, but behind that there was simply unspecified motion, assumed as a characteristic of the masses and left unexplained. The Atomist answer to the cosmological problem might therefore be compressed into the following statement: the present condition of the world is the development of vortical movements which have brought together and rearranged in mechanical fashion the original, unchanged atoms.

Philolaus appears to have attempted to reconstruct the old Pythagorean cosmology along the lines of the new idea of Force. To that end he developed the idea of Harmony, which had been prominent in the philosophy of his Order from the beginning, by giving it a position apart from substance and supposing it to operate from without on the stuff of which the world was constituted. This stuff he probably conceived as unchangeable, according to the Parmenidean doctrine, and as composed of the four Empedoclean elements; but those qualitative distinctions of its parts were so unimportant to his mind, as compared with the passive corporeality of the whole, that the concept came nearer the Aristotelian idea of mere matter than any other we have studied. The main activity of Harmony was the impression of forms on masses of stuff, in the course of which each such mass became separated

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from the rest and was thus individualized. This emphasis on form rather than physical or chemical components was the forerunner of the metaphysical theories of reality which appeared in Socrates, Plato, and Aristotle. It is to be noted further that the action of Harmony was not mechanically conditioned but free and intelligent like the *Nous* of Anaxagoras. Thus the answer of Philolaus to the cosmological problem might be reduced to a proposition like this: the present appearance of the world is the result of the impression of form (numbers) on the formless stuff of the world-sphere by the action of Harmony, a process which has both broken up matter into individual objects and established orderly interrelations (harmony) between these objects.

In the assumption of Love and Strife by Empedocles and of Mind by Anaxagoras we have seen the appearance of a new tendency in philosophy, which was to become of paramount importance. It was a biological interest, which implied a growing consciousness of the difference between animate and inanimate nature, and which probably was stimulated by the rise of scientific medicine. A rudimentary concern with vital processes had been present in cosmology from the time of Anaximander and had issued in various ethical and practical doctrines; but it now assumed a different aspect in that it became a manifestation of the spirit of organized investigation of nature in separate fields, as distinct from the old general cosmological speculation—a spirit that was no doubt partly induced by the mere accumulation of data in these separate fields and partly by the fruitlessness of cosmology. The earliest Sophists, who had the rudiments of a genuine philosophic interest, in emphasizing the futility of cosmology were led to contrast this speculative use of the mind with its

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practical use, as evidenced by all the institutions of civilization. And this doctrine fell upon good ground at Athens, where the Periclean democracy was becoming self-conscious and self-confident after half a century of political and commercial success. Thus the contrast between animate and inanimate nature, which had grown to prominence in cosmology, was changed by the influence of the Sophists at Athens, into a contrast between human intelligence, and the brute movement of the rest of the world. Further investigation of this intelligence by the Sophists was rendered impossible by their preoccupation with their own fortunes, but was undertaken by Socrates. His particular concern was with human knowledge and conduct, to the exclusion not only of cosmological speculation but also of all natural knowledge. But these human problems were taken up by Philolaus, Democritus, and Plato, and given a place in philosophy by the side of scientific and cosmological considerations; and the whole construction was systematized by Aristotle. There can be no question that Socrates, Plato, and Aristotle were fully conscious of previous philosophical development, and that they utilized their several interpretations of that development in constructing their own contributions to philosophy.

We shall not pursue further the attempt to appreciate the connections between the various thinkers in Greek philosophy, as those connections in the second period are too well known to call for restatement. If the attempt thus far has been successful, it has demonstrated the possibility of conceiving a unity underneath the different cosmological systems of the first period and an unbroken connection between the first and second periods, so that the whole, in spite of the variations which are so frequently

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emphasized, appears as an organic growth of ideas. From this point of view the specific differences in the thought of various philosophers and periods take on a permanent significance as attempts to rationalize new experiences or freshly discovered data, and reconcile them with the old facts or recast old facts to suit them. The unity which persists is always a logical quality of the thought, but advance may lie either in a new idea or in newly discovered data. Greek philosophy is thus the record of a concerted tendency in the Greek mind to observe environment and self and to translate the observations into terms of universal human significance.

It might be taken for granted that the study of such a record would be valuable, both in gaining a certain substance of significant thoughts and in appreciating the possibilities of the human mind by means of one of its great achievements. Such a view, however, cannot be taken for granted; if accepted, it must be vindicated in the face of powerful opposition. Kant speaks with disdain of those "learned men, to whom the history of philosophy (both ancient and modern) is philosophy itself"; and he implies that the function of these historians is merely "to inform the world of what has been done."¹ There is no doubt that this view is still widely held, and, what is worse, that the history of philosophy is frequently taught as Kant described it. Even so the history of philosophy is in no worse a plight than all history, which always gains value only in proportion to the understanding of the historian. The study of history is consistent with originality, and of the latter there is always need, as much in philosophy as elsewhere. If the history of philosophy were to

¹*Prolegomena to Any Future Metaphysic*, Introduction (Mahaffy and Bernard).

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deaden curiosity and inventiveness, there would be good reason for objecting to it; but on the other hand, is mere originality *per se* a good? What is original can only be defined by reference to what is previously known, and an inventive impulse without historical training is likely to discover for itself what has already been discovered.

The root of the trouble with the history of philosophical opinion, I think, lies in the method with which it is frequently pursued. In the words of T. H. Green: "The common plan of seeking this history in compendia of the systems of philosophical writers, taken in the gross or with no discrimination except in regard to time and popularity, is mainly to blame for the common notion that metaphysical inquiry is an endless process of threshing old straw. Such enquiry is really progressive, and has a real history, but it is a history represented by a few great names."² If study of the history of philosophy means that one person reads or hears what a second person (the historian) says about a third person (the philosopher), then the function of second parties tends to become merely reporting "what has been done" and the function of third parties is likely to appear as "threshing old straw." But if such study is directed immediately to the works of philosophers themselves and the professional historians take their proper place as third parties aiding in the performance, the history of philosophy—and not least, the history of Greek philosophy—can become a means of acquiring ideas of universal import, understanding the process of ideas, and gaining an insight into the natural capacities of the mind.

There are indeed many philosophical problems which cannot even be adequately comprehended without a thor-

² Introduction to Hume's *A Treatise of Human Nature*.

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ough historical preparation. For example, how can the meaning of truth be appreciated except by first watching the long struggle which philosophy and science have made for it? We begin to grasp the problem after we have seen one age assert the falsity of that which the preceding age pronounced true. Again there is science: do we have more than an inkling of what it is, unless we observe its early halting steps in various fields of investigation, its growth in ideas as well as in data, and the correlation of the separate departments of it, as geometry, the science of space, and algebra, the science of number, have been brought together in coordinate geometry? Only then can we understand the question what the underlying principle and the limitations of science are. Finally consider philosophy itself. Sooner or later every thinker must ask himself what philosophy is, how it is possible, and whether there is any progress in it; and such problems can neither be grasped nor solved without a thorough grounding in the history of ideas. It is in fact only by the history of philosophy that philosophy becomes aware of its own nature. It may or may not be the function of this history to undertake full discussion of the problems that arise out of it; that is a question of jurisdiction, as it were, and a matter of comparatively little moment. The important point is that only through the history of philosophy does philosophy become conscious of itself.

APPENDICES

APPENDIX I

THE FRAGMENTS OF PHILOLAUS

THERE has been a long controversy over the authorship of the fragments ascribed to Philolaus; and modern scholarship has run the gamut from the view of Boeckh that all are genuine to that of Burnet, who accepts none of them. Diels regards a large number of them as genuine.

Burnet (pp. 281-4) bases his contention mainly on the facts that the fragments are written in Doric and that one of them refers to the five regular solids. With regard to the first point Burnet says (p. 282) that "Ionic was the dialect of science and philosophy till the time of the Peloponnesian War." But (1) he admits (*ibid.*, n. 5) "one Doric (or Achaian?) form" in the fragments of Alcmeon of Croton, who must have written considerably before the war started; (2) he holds (*Gk. Phil.*, I, p. 231) that the *δισσοὶ λόγοι*, written in Doric, belong to the end of the fifth century, which is the period of the war; (3) Philolaus probably lived through the war (cf. Burnet, p. 276). With regard to the second point, Burnet asserts (p. 283) "there can be no doubt that one of the fragments refers to the five regular solids," whereas the Scholia to Euclid say that these were not known to the Pythagoreans but were discovered in the Academy. But (1) the fragment in question (12, *DFV*, p. 244) does not mention the solids or geometrical figures, but refers to five "bodies," fire, water, earth, air, and the hull of the sphere, the last of which Burnet (p. 294) accepts as "a genuine Pythagorean expression"; (2) Aetius (II, 6, 3, *DFV*, p. 237), representing Theophrastus, implies that the five regular solids were known to Pythagoras himself, and "It is important to remember that Theophrastus was a member of the Academy in Plato's last years" (Burnet, p. 305) when two of the figures of the regular solids were supposedly discovered according to the

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Scholia to Euclid.—As for the fact that Aristotle “does not appear to have seen the work from which these fragments come” (Burnet, p. 284), it is evident that Aristotle was badly confused by the “so-called Pythagoreans”; there are other works which we might have expected him to know but which he does not mention, and Burnet himself (p. 278, n. 4) has called attention to “the defective character of our tradition” in regard to Philolaus. Until the discovery of the Anonymous Londinensis, no one knew that Philolaus wrote on medicine. For these reasons I see no obstacle to accepting the fragments of Philolaus as genuine.

My main contention, however, is that the views set forth in the fragments can be properly fitted into an historical development of Pythagoreanism, and that they agree with philosophical tendencies of the time when they are supposed to have been written. This I have tried to show in the chapter on Philolaus in Part I. I give a translation of the fragments (according to the arrangement in *DFV*), in order to facilitate a better understanding of their contents.

1. In the ordering of the world, nature (both the ordered whole and all the things in it) was harmonized out of unlimited and limiting things.
2. It must needs be that all things which exist are limiting things or unlimited things, or both limiting and unlimited things—limiting solely or unlimited solely they could not be. Now since they are evidently not composed of limiting things altogether, or of unlimited things altogether, the ordered world and the things it contains must have been fitted together out of limiting and unlimited things. This is apparent also in fields of tilled land; for some of them, formed by limiting things, are limits; others, composed of limiting and unlimited things, now limit and now do not limit; while still others, formed of unlimiteds, turn out unlimited.
3. If everything is unlimited, there will be absolutely nothing that will be known.
4. In fact, all things that are known have number, for without this nothing can be known or comprehended.
5. Now number has two special forms, odd and even; and there is a third form, the odd-even, composed of the other two mixed.

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And of each of the two forms there are many figures, which are manifested by particular objects.

6. With nature and harmony it is as follows: The real substance of things, which is eternal, and indeed nature in itself admits of divine but not human knowledge—no more at any rate than our knowledge that it would not be possible for anything that now exists and is known¹ by us even to come into being, if it were not for this underlying substance of the things (both limiting and unlimited) from which the ordered universe was constructed.

But since these original factors were neither similar nor related, it would have been impossible to make an ordered universe with them, if harmony had not supervened on them in the way it did. For similar and related things needed no harmonizing; but things that were dissimilar and heterogeneous and composed of unequal parts must have been shut up together by a harmony that would hold them in a natural order.

The magnitude of a harmony is a Fourth and a Fifth. The Fifth is greater than the Fourth in the ratio 9:8. For from Hypate to Mese is a Fourth, from Mese to Nete a Fifth, from Nete to Trite a Fourth, and from Trite to Hypate a Fifth. The interval between Mese and Trite is 9:8; the Fourth is 3:4; the Fifth 2:3; the Octave 1:2. Thus a harmony is five intervals of 9:8 (*sc.*, whole tones) and two semi-tones; the Fifth is three whole tones and a semi-tone; the Fourth is two whole tones and a semi-tone.

7. The first thing that was fitted together, the unit, which is in the middle of the sphere, is called the hearth (*sc.*, of the universe).
8. Unity is the beginning of all things.
9. By nature and not by law.
10. For harmony is a union of things mixed from many parts, and an agreement of variously minded beings.
11. We ought to see the effects and the nature of number in the power which lies in the decad; for this power is great, perfect, and omnipotent, at once the beginning and the director of the divine and heavenly life and of human life, sharing in. . . .

¹ Reading *γινγνωσκόμενων* for Diels' *γινγνωσκόμενον*.

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Without this all things are unlimited and meaningless and obscure.

For the nature of number gives to everyone knowledge, guidance, and instruction concerning everything that is doubtful and unknown. For not a thing would be clear to anybody, either what it is by itself, or in relation to other things, if it were not for number and the property of number. But as a matter of fact, number by harmonizing all things in the soul's perception makes them known and makes them correspond to one another according to the natural relations of the gnomon; for it is number that gives body and distinguishes the proportions of all unlimited and limiting things.

You can see the nature and power of number prevailing not only in the affairs of demons and gods, but also everywhere in all human words and deeds, in all skilled handicrafts, and in music.

Neither the nature of number nor harmony admits of any falsity, for that is not proper to them. Falsity and malice belong to the nature of the unlimited, unknown, and irrational. But falsity has no effect on number, to which it is inimical and hostile; while truth has the same nature and origin as number.

12. And the bodies of the sphere are five: those within the sphere are fire, water, earth, and air, and the hull of the sphere is the fifth.
13. The brain is the principle of thought; the heart, of soul and perception; the navel, of the formation and growth of the embryo; the genitals, of the deposit of semen and generation. Brain indicates the principle of man; heart, that of animals; navel, that of plants; and genitals, that of all things, for all things bloom and grow.
14. The ancient singers of the gods and seers also bear witness that for certain punishments the soul has been yoked to the body and buried in it, as it were in a tomb.
15. (We human beings are) in a kind of prison . . . (our guardians are gods and we human beings are) one of the chattels of the gods.
16. Certain reasons stronger than we are.
 - o. There is a guide and ruler of all things, god, one, eternal, single, immovable, like himself and different from all else.

APPENDIX II

CONJECTURE ON THE DEVELOPMENT OF PYTHAGOREANISM

THE historian of Greek philosophy must adopt some working hypothesis on the development of Pythagorean doctrine. The available evidence does not warrant more than a conjecture; but that much at least there must be as a basis for handling the source materials. As a matter of fact, every treatment of Pythagoreans implies such an hypothesis, though historians have naturally hesitated to develop their views on this point, owing to the insufficiency of the data. I offer the following, not because I believe the data are sufficient, nor because my interpretation of Pythagoras and Philolaus may be new, but only because I believe that it is better on the whole to bring implications and presuppositions into the open for frank, general discussion. Sometimes human beings cannot advance at all unless they enter where angels would fear to tread.

1. In chapter III of Part I, I have given my understanding of Pythagoras and the early views of the Order. The account there given implies that Pythagoras was an Ionian profoundly affected by the doctrines current in the Orphic revival, and that he combined science and mystical religion in the theory that contemplation of the world was the best method of purifying the soul. This theory became the doctrine practised by the society of his followers, which thus embraced scientific investigation with religious purification. The former of these impulses developed into a cosmological system, containing the following points: (1) the world has been formed out of two things, Fire and Air; (2) the former, being active, drew in, as by breathing, successive portions of the latter, which was a void; (3) these inhalations produced a separation of the original mass of Fire into limited individual bodies (sun, moon, etc.), and Fire was thus called Limit, Air the Un-

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limited; (4) the process of separation, being progressive, was governed by a law which is epitomized in the tetractys of the decad, and which is also manifested in the succession of natural integers and in the harmonic production of the fixed notes of the lyre.

2. The views given by Parmenides in *The Way of Opinion* contain Pythagorean features, but are not meant to be solely an account of Pythagorean doctrine; and they do not enable us to mark any progress of Pythagorean philosophy.

3. The society which Pythagoras founded multiplied and new branches were formed in different Greek cities. Most of these branches emphasized mainly the scientific feature of the Founder's doctrine and tended to drop the primitive taboos; they were sometimes referred to as Pythagoreans or Mathematicians. A few members of the Order insisted on the original purificatory practices and tended to neglect scientific investigation; they were called Pythagorists or Acousmatics, and were frequently parodied in the Middle Comedy at Athens. The Order, on account of its mystical character, preserved its doctrines as secrets, as was the general rule with all Mysteries (cf. Orphic and Eleusinian). This rule of silence was observed by the Acousmatics; but when the religious side was altered by the Mathematicians, they felt no compunction about publishing their scientific views. In this way we can account for the very defective tradition in regard to the Founder and his early followers, and at the same time for the general information in regard to the views of Pythagoreans in the late fifth and the fourth centuries.

4. In the latter part of the fifth century the outstanding thinker in the Order was Philolaus, who came from Italy to Thebes, and then returned to Italy. The scientific section of the Order at this time was mainly interested in mathematics (arithmetic and geometry), and had made great progress in that subject. But Philolaus also developed the traditional cosmology in the light of recent tendencies in philosophy. I have given my interpretation of his thought in chapter ix of Part I, which may be summarized as follows: (1) the point of view now includes the individual objects of nature; (2) these are said to be constituted by a form or limit impressed on stuff or body; (3) the body itself consists of the four Empedoclean elements; (4) the object is known by its form, shape

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and size, which is called number; (5) the form is the action of a cosmic force, called Harmony; (6) knowledge is made possible by the fact that objects have form or number, which may be measured.

5. The followers of Philolaus, who belong to the first part of the fourth century and were contemporaries of Plato, were thinkers who lacked intellectual vigor; and they exercised their little originality merely in attempting to extend some of Philolaus' views. Philolaus had held that things have number; but his pupil Eurytus maintained that things are numbers and he would demonstrate the numerical properties of an object by arranging pebbles in the outline of the object. Other members of the Order refused to go as far as Eurytus and were content with the theory that things were like numbers or were made according to numbers. We can see that the presupposition of these views is the doctrine that the point is a unit having position and that space or extension is made up of points. The thought of the Order at this time, as Aristotle hints, was really an attempt to turn mathematics into cosmology on superficial analogies.

6. Both Socrates and Plato were deeply interested in Pythagorean views, and many of the Pythagoreans, especially those who possessed a genuine interest in science, were attracted to the Academy. It would seem that the Pythagorean impulse for scientific investigation was largely absorbed by the Academy in Plato's last years; and Aristotle speaks as if there were only minor differences between some Pythagorean views and those of Plato. But the Acoustics continued independently to maintain the ancient religious practices.

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